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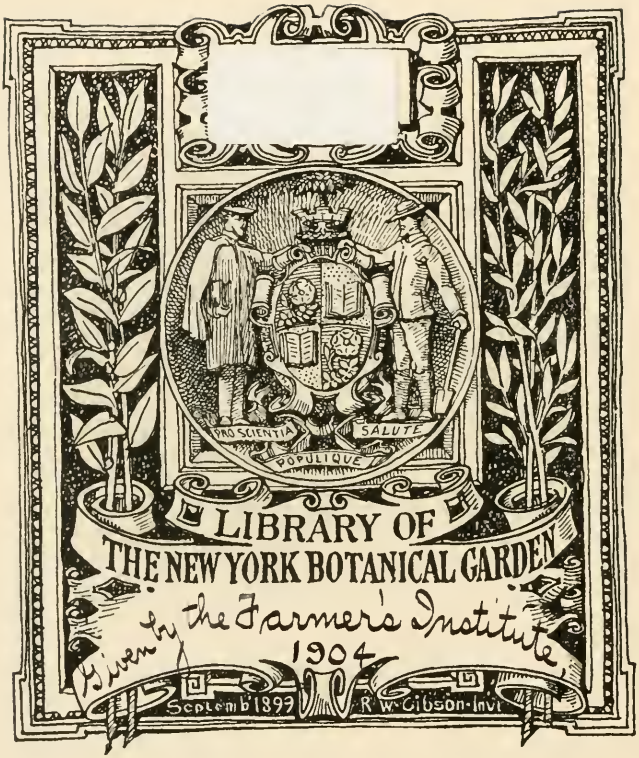
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MICHIGAN

STATE

FARMERS' INSTITUTES

WINTER OF 1901-1902

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SUPERINTENDENT OF INSTITUTES.

CLINTON D. SMITH, - - Agricultural College, Michigan

MAY 2 1904

LETTER OF TRANSMITTAL.

To the State Board of Agriculture:

Gentlemen—I have the honor to transmit herewith a report of the institute work carried on under your direction, during the year beginning July 1, 1901. This report includes:

The annual report of the superintendent.

A condensed report of the joint meeting of the annual Round-up Institute and the Michigan Political Science Association.

Table showing the attendance at the county two-day, and the one-day institutes.

I respectfully recommend that this report be printed.

Respectfully submitted,

CLINTON D. SMITH,

Superintendent Farmers' Institutes.

AGRICULTURAL COLLEGE, MICHIGAN,
May 1, 1902.

REPORT OF SUPERINTENDENT.

President J. L. Snyder:

I submit, below, a report of the Farmers' Institutes for the season of 1901-02. There will be other one-day institutes carried on before June 30, 1902, but it seems wise to issue now a report of the Round-up Institute and a statement of the attendance at the county and one-day meetings to date.

This report will include, first, a full report of the State Round-up Institute, and, later, statistics as to the work done in the several counties.

No radical changes have been made in methods. The speakers have been chosen from the college faculty, from successful farmers who can at the same time present their ideas in coherent form and in language that is readily understood, from the faculty of the University, from the faculty of the State Normal Schools and from the several departments of the State government. In nearly every case the speakers sent out have given satisfaction. In some cases there have been occasion for just criticism because the speakers were unable to answer technical questions or in their addresses or answers to questions have exhibited a lack of perfect knowledge of scientific questions involved. Happily, these occurrences have been few, and in the main the work done by the speakers has been eminently satisfactory. It has occurred to me, however, that it would be well in the future to insist upon some systematic reading on the part of the speakers who are to take part in the programs. For instance, if a man is to speak on soils and crops he should have become acquainted with several of the best text books on these subjects, text books which bear in condensed form the experiences of the best thinkers, practical farmers. The same way in fruit and live stock lines. It is hardly safe to send men to instruct farmers who are not conversant with what is written on the topics which they present. It is to be regretted that the burden of the work heaped upon the faculty of the college prevents its members from taking a more active part in this branch of the college extension work. There is demand for our men, and frequent journeys into the different parts of the State and intimate contact with the people cannot fail to benefit both the institution and the farmers.

I wish to speak in terms of highest commendation of the work of the county officers. No one not intimately associated with the institute movement as carried forward in this State can appreciate the amount of work the county secretary, especially, and his associates are called upon to perform. Much of the institute work is still distinctly missionary work. We are carrying knowledge to many people whose hunger after knowledge

is but little aroused. This means that in advertising the meeting it is not sufficient to put notices in the local newspapers, and paste up conspicuous posters, there must be added the visits to the homes of the people who need the instruction most, and a pressure upon them to attend and take part. This work requires ability, push and tact. The almost phenomenal success of the one-day institutes in many counties is the best evidence of the ability and application of these officers. It must be remembered, too, that in most cases no compensation is provided for them, and their successful activity springs from their love of their fellow men and of the work.

I am glad to record the hearty support of the local press. In more cases than one the county and local papers have opened their columns free to statements and paragraphs about the institutes, and after the meetings have closed, these papers have published full accounts of the essential parts of the program.

The one-day meetings have been located, for the most part, in villages remote from the county seat, and other centers of population. The good which they do cannot be measured by the size of the audience. In one county, for instance, at no session was there in attendance over sixty, yet in the four one-day meetings there was over a hundred and fifty people who had never attended institutes before, and whose intellectual horizon was broadened and whose enthusiasm was aroused by the program. The amount of good accomplished was immeasurable, yet no adequate idea is given by the figures set opposite that county in the record of attendance of the one-day institutes in this report. The number of one-day institutes have greatly increased. The call for these meetings next year indicates that the work is to develop along that line. The limitation of the work is the number of competent speakers that can be obtained. In the older parts of the State where the people have the benefit of strong farmers' organizations and are habituated to reading and study, the task of satisfactorily instructing them in the one-day institutes is far from easy. I have found it extremely difficult to secure competent speakers who can be induced to leave their business and are willing to undertake the task.

Allegan county has taken the lead in the one-day institutes, having held during the past campaign 49 separate institutes, 147 sessions and reaching nearly every township in the county. The reports of the proceedings of the institutes are published in a bulletin issued by the officers of the County Institute Society.

Other counties are following the lead of Allegan county and are holding from ten to twenty institutes each season, bringing the farmers of the several neighborhoods together and paving the way for farmers' clubs and the grange.

In the early winter a letter was received from the secretary of the Michigan Political Science Association asking for a joint meeting of the farmers' institutes and that association. This application was granted and a joint meeting was held at the college February 25, 26, 27 and 28, 1902. The railroads, with their far-sighted generosity, granted us the usual half fare rates. The college opened wide its doors to receive the farmers, their friends and the members of the Political Science Association. The program of the joint meeting differed in no essential particular from the usual program of the round-up institute except that the topics relating to education, forestry, organization, and the relation of the peo-

ple to the Department of Agriculture and the various institutions of learning and experimentation were bunched into the first two days. Fortunately, as the program below will show, some of the most distinguished gentlemen interested in the topics, men of national reputation, found it possible to be present. There was thus brought together on one program representatives of the various forces engaged in the education and moral uplift of the citizens of the State. The fact that each force thus represented was but one factor in a grand scheme was made apparent. The program at the county institutes had prepared the delegates for this joint meeting since on nearly all of them the great majority of the topics found on the round-up program had been discussed.

Not the least important work of the county institutes is to teach the local communities the very patent fact that the school and church, the farmers' organizations and the municipal or township government are separate forces united in one aim, the financial, intellectual and moral betterment of the community. The same idea was kept in mind in the makeup of the program of the joint meeting. The thanks of those who were permitted to attend the joint meeting and of all readers of this report are due to Prof. H. C. Adams of the university for his suggestion of the advisability of a joint meeting of these two organizations, for his invaluable assistance in making up the program, and, finally, for his service to the State in bringing to the college many of the distinguished speakers which graced the program on this occasion.

I am glad to report that the attendance at this annual meeting was very large, fully as large as last year. It would be impossible to name the parts of the program of most interest and benefit. The audience was very largely composed of farmers sent here as delegates from the county institute societies or from granges or farmers' clubs. These men are primarily citizens of the commonwealth. They listened, therefore, with the greatest interest and enthusiasm to the discussion of economic, educational and forestry questions, as well as to those related to farmers' organizations, the movement of population, the relation of the church to rural communities and the everyday topics concerning methods of managing herds, orchards and fields.

Your attention is called to the exercises which occupied the morning hours of the institute days before the beginning of the general sessions in the armory.

All visitors to the college interested in domestic science, whether women or men, were invited to attend the classes in cooking and sewing in the women's building. These classes began at eight o'clock. I am glad to report that a large number of visiting delegates found their way to this building at this seemingly unfavorable hour and were much benefited by the discussions there, in some of which they took an active part.

In the same way, those interested in horticulture came to the college early in the morning to attend the lectures and demonstrations by Professors L. R. Taft and U. P. Hedrick at the horticultural laboratory. By means of the stereopticon the processes of budding and grafting were described and illustrated in detail. Utilizing the college orchards, and, again, using the stereopticon, the pruning of different classes of fruit trees under different conditions and for different purposes was fully illustrated. On the third morning the subject of spraying, insecticides and fungicides was gone over and the topic brought up to date.

Meantime, at the college barns, Professor J. J. Ferguson and Mr. George Humphrey were illustrating methods of stock judging, taking up, in order, the breeds of cattle, sheep and swine, which had typical representatives in the college herds. A large number of delegates and visitors attended each of these exercises. By reason of the excellent equipment of the college, definite and direct instruction could be given of a kind impossible elsewhere.

The conferences of county secretaries and institute workers each morning was productive of much good. Methods of carrying forward the work which had proven sucessful in one county were discussed by delegates from other counties and adopted by them as far as they were applicable to conditions existing there. This public and private comparison of notes at the annual institute is leading to greater uniformity of methods in the several counties and is sure to bring forth better plans and better institutes.

The granges and farmers' clubs have been of incalculable value to the institute work during the past campaign. In many places these organizations have opened their halls to our use and have advertised the meetings in ways impossible through other channels. They have trained not only the speakers which travel from county to county but have developed the local talent as well. Wherever there is a live organization among the farmers, there the institute is always well attended and the discussions lively and interesting. For these reasons it has not seemed out of place to directly encourage at all the institutes, the organizing of clubs and granges.

I cannot close this report without again expressing the appreciation of all those interested in the institute movement of the generosity of the railroads in carrying the workers from one meeting to another at a half fare rate. By their action in this matter, the railroads have made possible the increased number of institutes this year and have greatly aided in building up some of the newer portions of the State.

The thanks of the institute management is due to the Industrial School band and choir for the most excellent music furnished at the sessions of the round-up institute; to the M. A. C. band for similar service, and to the students of the college who, by piano trios, vocal solos or other musical efforts enlivened the program of the closing institute.

CLINTON D. SMITH,
Superintendent.

Michigan Agricultural College, May 1, 1902.

PROGRAM OF JOINT MEETING

OF THE

MICHIGAN FARMERS' INSTITUTES

(SEVENTH ANNUAL ROUND-UP)

UNDER CONTROL OF THE STATE BOARD OF AGRICULTURE

AND THE

MICHIGAN POLITICAL SCIENCE ASSOCIATION

(ELEVENTH ANNUAL MEETING)

HON. DEXTER M. FERRY, DETROIT, PRESIDENT,
HENRY C. ADAMS, ANN ARBOR, SECRETARY,

AT THE

MICHIGAN AGRICULTURAL COLLEGE,
February 25, 26, 27 and 28, 1902.

PROGRAM.

TUESDAY AFTERNOON, FEBRUARY 25, 2:00 O'CLOCK.

COLLEGE ARMORY.

Vice President Arthur Hill in the chair.
Music.
Invocation, Rev. H. B. Bard, Lansing.
Introductory Address by the Presiding Officer.
Economic Value of Industrial Education,
President J. L. Snyder, Agricultural College.
The Higher Education and the People,
H. C. Adams, University of Michigan.
Music.
The Shifting of Agricultural Population,
Dr. C. H. Cooley, University of Michigan.
The music for the session will be furnished by the Industrial School choir.

TUESDAY EVENING, FEBRUARY 25, 7:00 O'CLOCK.

Vice President W. M. Burke in the chair.

Music.

Changes Demanded in the Educational System of Rural Communities.

L. D. Harvey, Superintendent of Public Instruction, Madison, Wis.

Music.

The Rural School Problem in Michigan.

Delos Fall, Superintendent of Public Instruction, Lansing, Mich.

Discussion of the afternoon and evening topics, led by

A. S. Whitney, Ann Arbor.

Music.

The music for the session will be furnished by the Industrial School band.

WEDNESDAY FORENOON, FEBRUARY 26.

8:00 a. m.—Classes in Cooking and Sewing, Women's Building.
8:30 a. m.—Conferences of County Secretaries and Delegates in the College Chapel.
8:30 a. m.—Pruning, at the Horticultural Laboratory.
8:30 a. m.—Judging Beef and Dairy Cattle, Agricultural Laboratory.
9:00 a. m.—Business Meeting of the Michigan Political Science Association in the College Armory.

COLLEGE ARMORY, 10:00 A. M.

Hon. E. P. Allen, Ypsilanti, in the chair.

The Condition and Significance of the Forestry Movement.

Hon. Gifford Pinchot, Chief, Division of Forestry, Washington, D. C.

The Forestry Problem in Michigan.

Hon. E. A. Wildey, Commissioner of the Land Office, Lansing, Mich.

Discussion led by C. A. Davis, University of Michigan and Hon. C. W. Garfield, President of Michigan Forestry Commission, Grand Rapids, Mich.

WEDNESDAY AFTERNOON, FEBRUARY 26, 2:00 O'CLOCK.

A. B. Cook, President State Farmers' Clubs, Owosso, in the chair.

Music, Vocal Solo, "In May Time." - - - - - - Dudley Buck.

Prof. C. S. Joslyn.

Introductory Address by the Presiding Officer.

Need and Possibility of Organization Among Farmers,

Hon. Geo. B. Horton.

Music, "The Gondolier's Song." - - - - - - Beethoven.

Prof. C. S. Joslyn.

The Church as a Center of Rural Organization,

Graham Taylor, Chicago.

Discussion led by Kenyon L. Butterfield, Ann Arbor.

Music. (a) The Rosary. - - - - - - - - - Nevin.

(b) Bring Her Again to Me. - - - - - Burnham.

Prof. C. S. Joslyn.

WEDNESDAY EVENING, FEBRUARY 26, 7:00 O'CLOCK.

Governor A. T. Bliss in the chair.

Music.

Introductory Address by the Presiding Officer.

The Department of Agriculture and the Farmer.

Hon. James Wilson, Secretary of Agriculture, Washington, D. C.

Dependence of Agriculture on Transportation.

Hon. E. A. Prouty, Member Interstate Commerce Commission, Washington, D. C.

Dependence of Agriculture on the Home Market,

C. D. Jones, University of Michigan.

Music.

The music for this session is furnished by the College band.

Reception in honor of Secretary Wilson at the Women's Building immediately on the adjournment of this meeting.

THURSDAY FORENOON, FEBRUARY 27.

8:30 a. m.—Conference of County Secretaries, Delegates and Institute Workers in the College Chapel.

8:30 a. m.—Classes in Cooking and Sewing in the Women's Building.

8:30 a. m.—Lectures and Demonstrations in Grafting and Budding at the Horticultural Laboratory.

8:30 a. m.—Exercises in Judging Sheep at the Agricultural Laboratory.

COLLEGE ARMORY, 10:00 A. M.

J. D. Towar, Agricultural College, in the chair.

A discussion of the Factors entering into the Economical Production of a crop of Sugar Beets, led by

W. H. Gilbert, Lansing, on Preparation of the Soil and Seeding;

C. T. Richards, Alma, Thinning and Cultivating;

I. D. Suydam, St. Louis, Harvesting.

A free discussion follows in which all talks are limited to five minutes each.

THURSDAY AFTERNOON, FEBRUARY 27, 2:00 O'CLOCK.

T. G. Adams, Shelbyville, in the chair.

Music.—Piano trio, - - Misses Barrows, Crossman and Barton.

A discussion of the Factors entering into the profitable production of meat in Michigan in competition with the Corn belt, led by

J. J. Ferguson, Agricultural College, on the kind and quality of stock to raise.

Song, "Chant d' Amour," - - - - - - C. Chaminade.

Irving Gingrich, M. A. C.

A. M. Welch, Ionia, The silo for lambs and steers.

Hon. L. W. Watkins, Manchester, The simplest method of handling the corn crop.

Song, "Oh Promise Me," - - - - - - By Reg. De Koven.
Irving Gingrich.

A free discussion follows in which all talks are limited to five minutes each.

THURSDAY EVENING, FEBRUARY 27, 7:00 O'CLOCK.

Hon. C. J. Monroe in the chair.

Music.

Rejuvenating the Apple Orchards, L. R. Taft, Agricultural College.

Canada—What she has Done for the Farmer by Organization,
Hon. Geo. C. Creelman, Toronto, Canada, Superintendent of Institutes for Ontario.

Music.

The Canning Factory, Geo. E. Hilton, Fremont, Mich.

Raising Fruit and Vegetables for the Canning Factory,
George E. Rowe, Grand Rapids, Mich.

Discussion.

The music for this session is furnished by the M. A. C. orchestra.

FRIDAY FORENOON, FEBRUARY 28.

8:30 a. m.—Conference of County Secretaries and Delegates at the College Chapel.

8:30 a. m.—Classes in Cooking and Sewing at the Women's Building.

8:30 a. m.—Lecture and Demonstrations in Spraying, Horticultural Laboratory.

8:30 a. m.—Exercises in Judging Swine, Agricultural Laboratory.

COLLEGE ARMORY, 10:00 A. M.

David Woodward, Lenawee County, in the chair.

A discussion of the Factors entering into the Profitable Production of Butter on the Farms of Michigan, led by
W. A. Ellis, Braidwood, Handling Cream and Making Butter.

A free discussion follows in which all talks are limited to five minutes each.

Report of the proceedings of the joint meeting of the Michigan Round-up Farmers' Institute and the Michigan Political Science Association.

PROCEEDINGS OF THE JOINT MEETING.

REPORTED BY KENYON L. BUTTERFIELD, ANN ARBOR.

TUESDAY AFTERNOON.

Vice President Arthur Hill in the chair.

Prof. C. D. Smith, Superintendent of Institutes, called the meeting to order, and introduced as chairman for the afternoon Hon. Arthur Hill, Vice President of the Michigan Political Science Association.

Mr. Hill in taking the chair thanked the Agricultural College in behalf of the Political Science Association for the invitation to hold the joint meeting and for the fine arrangements made. He also remarked that he was simply endeavoring to fill the place, temporarily, of Hon. D. M. Ferry, President of the Michigan Political Science Association, a man who deserves to be remembered as a warm friend of everything progressive and elevating. Mr. Hill said that such a gathering as this is possible because 99 per cent of the attendance is here for mutual help. "The purpose of this meeting is to bring together the thinker who toils and the toiler who thinks." I like one thing about your farmers' organizations. You study the things you want and not the things you don't want, and you advocate what you want and oppose what you don't want. Our Political Science Association does not do enough of this kind of work. We point the way, but we don't have the corps of wood choppers who hew out the way. Today of all times the getting together of various agricultural organizations is important. Take for instance the beet sugar industry which is likely to be cut down. Havemeyer, the sugar king, is sending out millions of tracts to clergymen, college professors, etc., advocating the keeping of the sugar trust in power, and they are having a great influence. The only way to meet this influence is for the farmers to organize."

ECONOMIC VALUE OF INDUSTRIAL EDUCATION.

PRESIDENT J. L. SNYDER.

Industrial education is a term used to designate a great many types of instruction. It may mean anything from the simplest manual training work in the elementary grades of our public schools to the highest form of engineering work in our best technical schools. The term has been so used and abused that many hear it with impatience, or regard it as a fad of lay theorists, or very often as a cloak for educational shortcomings in other directions. In this paper the term will be used with reference particularly to that phase of work more commonly called technical education. The prosperity of all the industrial interests of this nation is largely due to technical training. In mining, agriculture, manufacturing, trained minds and skilled hands are directing the efforts of the multitude of workers. Where there is one man able to improve present systems and methods, a thousand stand ready to carry out his plans. The discoveries in science and the many inventions in labor-saving machinery, and in the use of steam and electric power, have brought about a new condition of affairs. Let us look first at some of the results of technical training in the United States.

This branch of industrial education has developed almost entirely during the last half century. Only a few such schools were in existence in this country at the close of the civil war, but in recent years they have increased in numbers very rapidly. Not to enumerate private institutions, each state has such a school established under the provision of the Morril Land Grant Act of 1862. These colleges alone have an enrollment of over 40,000 students and hold property valued at sixty million dollars, with an annual income of about six million dollars.

In recent years nearly all of our large universities have added departments of engineering, and a few have added departments in other technical subjects. There have also been a number of semi-technical schools established in this country, of which Pratt Institute, Brooklyn, the Lewis and Armor Institutes of Chicago, are fair types. Below these come the manual training schools, secondary schools with manual training departments, and manual training as taught in our grammar and elementary grades.

All these schools have done and are doing much to make this country a great commercial nation. A nation to be great must be thrifty,—all classes must be employed and their labor must count for something. They must produce more than they consume and this over production must be such as other countries will call for. It must be the product of the highest skill. No nation will import goods that its own artisans can readily produce. Fifty years ago England had the finest workmen in the world; her shops turned out the best machinery, her mills the best cloth, and just as long as she was able to produce the best her commerce increased. When she failed in this her commerce began to wane.

Our engineering schools are young, yet their graduates are doing much

of the important engineering work of this country today. Andrew Carnegie recognized the worth of technical training and was the first man to employ a trained chemist at a blast furnace in this country, and he had to be "made in Germany." With this man's knowledge, the company was soon making money out of slag, scale, etc., which other companies were throwing away. They were also soon able to discover a much better ore than the one used and for which they were paying a big price, and which was being used by other manufacturers. A few trained men like this chemist placed Andrew Carnegie in the lead as a manufacturer of iron and steel. He was always on the look-out for thoroughly trained young men from our best technical schools. He employed them and used their brains and skill even in the smallest details of his work. He elicited their best endeavors by giving them an interest in the business, and while many of them have become millionaires, they have made for him hundreds of millions of dollars. What is true of the iron industry is true of almost every other industry in this country. It is the young men with technical training who are forging this country ahead to industrial supremacy. We have outstripped other countries with cheaper labor because we have had a better supply of intellectual labor. It is the product of skilled labor that we are sending into other countries, and the influence of our technical schools in furthering our interests in this regard, is worthy of universal recognition.

It is almost impossible to form any definite or adequate idea of the benefit technical training has been to agriculture. In some states the dairy school has given this branch of farming a wonderful impetus. In five years—from '95 to 1900—the number of dairy cows in Wisconsin was increased 25 per cent. During the same period Minnesota added 7,200 dairy animals to her number, while the total number in this country, during the same years, suffered a marked decrease. The great increase in these states was due almost if not entirely to the influence of the dairy schools conducted by the agricultural department of their universities.

But the increase in the dairy business among the farmers is not the only benefit accruing from this dairy instruction. Perhaps the greatest benefit after all is in the increased value of the product turned out rather than in the increase in quantity. Creamery butter sells at a much higher price than that made in the old-fashioned way. Since the establishment of the dairy school in Minnesota 70 per cent of the butter is made in creameries. The value of the remaining 30 per cent has been enhanced also as the demand for the better product has stimulated better methods in home dairying.

What is true in Wisconsin and Minnesota is also true to a less degree in other states. The Babcock Test, which has done more for the dairyman than any other single discovery, was invented in the Wisconsin agricultural school.

Our experiment stations, which are a part of our agricultural colleges, have rendered very valuable service in the development of scientific and practical agriculture in this country. There is not space in such a paper as this to even begin to enumerate the many and successful experiments completed, which have been worth millions upon millions to our farmers. These experiment stations are in every state and are carrying on research work of the highest order. They have turned the search light of scientific

investigation and experimentation on the problems with which the farmers have been struggling for centuries, and are fast solving them.

The fruit orchards on the west shore of this State could scarcely have reached their present state of productiveness had it not been for the improved methods of spraying discovered and perfected very largely by our Michigan Experiment Station.

The chemical laboratory of our experiment station was the starting point of the beet sugar industry. This is where the first analyses were made which meant the weal or woe of the beet sugar enterprise.

The forestry problem is now being solved in schools of forestry and experiment stations. The practical work will follow based upon experiments and methods tried and proved before being placed in operation on a large scale. The scientific and technical knowledge gained from painstaking work in our experiment stations is distributed free of charge to all farmers who care for this information. Much of this practical knowledge is given from the platform of our farmers' institutes. A faint idea may be gained of the work done in this line when it is stated that 674 sessions of the institute have been held this year with an average attendance of 148, making all told the equivalent of an attendance of approximately 100,000 people at one session. Other states are spreading this technical knowledge in a similar way. There is perhaps no way of determining the economic and financial results accruing to the farmers from the technical knowledge received at these institutes, but it is admitted on every hand to be very great.

The department of agriculture at Washington is a great technical school. Many of the best experts in the various scientific lines of agriculture in the world are to be found there. These are in close touch with all the other scientific workers in similar lines throughout the country. The assistance rendered to the agriculturist in dairying, animal husbandry, fruit culture, and the various other lines can scarcely be computed in dollars.

What has technical education done for the countries of Europe?

Germany has led the world in meeting the new industrial conditions by establishing schools where the science and skill of industrial handicraft are given. Twenty years ago there was founded in Crefield, Germany, a school for the sole purpose of teaching weaving and dyeing and such allied arts and sciences as are useful in the weaving and dyeing industry. The impetus given this industry by the opening of this school was marvelous, affecting not only the textile industry of Crefield, but in all Germany. Silk goods formerly made in France are now exported into France from Crefield. Since the establishment of this school the city has prospered marvelously. Other schools all over the world have been modeled after this one and its graduates are employed by the manufacturers of textile goods throughout the whole world. Other cities where the weaving and dyeing industries are established have found it necessary to establish such schools in order that they may have a higher grade of skill among their employes. Germany has carried out the idea of industrial education in a very thorough and systematic manner. The best papers read in this country or in any other country on any phase of technical training have been translated into the German language and delivered to all schools interested. Their aim seems to be in this matter to know all that the remainder of the world knows and just a little more, and their success has been marvelous. The dissemination of this technical knowledge,

together with her industrial education, has brought prosperity to Germany. Her manufacturing progress has gone hand in hand with her national progress. Not only has she made marked progress in recent years in her railroads, ship building and steel working, but in the buildings, order and general amenities of life of her great cities such as Berlin, Frankenmuth and Cologne.

England, the "Mistress of the Seas," has been steadily losing ground in her foreign trade during the last quarter of a century. In 1870 she did one-quarter of the world's commerce, and including her colonies, 35 per cent; but twenty-five years later, in '95, her share had fallen to 18 per cent, or including her colonies, 31 per cent. During the same time her exports increased but 13½ per cent, while those of Germany increased 42 per cent, and the exports from the United States increased 110 per cent, showing that during the last one-third of a century England's commercial advancement has not kept pace with that of other nations. This fact was discovered by some far-sighted Englishman about twenty years ago, and in true English style a parliamentary investigation was undertaken which showed that both Germany and the United States had encroached largely on the field of commerce formerly held by Great Britain. Two causes were assigned for this loss of trade,—the Americans were given credit for superior natural inventiveness, but the Germans' rapid rise was attributed to the training given their artisans in their technical schools. England must observe with regret how certain branches of industry have almost altogether abandoned her country and gone to those which have paid more attention to technical education. Nearly every requirement of a drawing office can be better and more economically obtained in Germany than in England. Our pure chemicals, our filter paper, and most of our glass apparatus come from Germany. There is also where we go when we require any original or special piece of apparatus. The British mechanic is second to none as a workman, but he does not have the theoretic and technical knowledge necessary to place him on the same plane with the German artisan. This is why Germany is pressing England so closely in all lines of manufacture from steel to watches,—from marine engines to scientific apparatus. But England has awakened. In 1882 she had but 1,402 schools giving technical instruction to 68,000 students, but in '95 both the number of schools and number of pupils had more than doubled. Manchester has erected a technical school costing $650,000 in which more than 4,000 students now receive instruction. As much of this instruction is given in the evening, the economic results have not been as marked as in cities where students are given extended courses. Yet the industries in and about Manchester have received, it is conceded, a great impetus from the instruction given in this school. The Central Polytechnic School in London is doing a great work. From a little corner in which a few little ragged urchins were taught to read the Bible by the uncertain flicker of a candle in the neck of a beer bottle, this school has grown until it now has 16,000 members. The greater part of the instruction in this school is also given in the evening, and while it may make somewhat better artisans, it cannot be relied upon to place the students in a position to compete with other students who have taken full courses in technical schools. England, however, realizes her condition. She knows that to hold her supremacy as a nation she must improve the skill of her artisans, and great advances may be looked for within the next few years in techni-

cal instruction in Great Britain. She was slow in realizing her condition. Switzerland, Germany and the United States were fast crowding her out of certain lines of trade and it was a matter of self-preservation that first induced her to foster industrial education.

At one time England passed a law requiring all goods imported from Germany to bear the inscription, "Made in Germany." This was intended to designate the article as inferior to that made at home. Germany was compelled to bear this reproach for a time, but when, a few years ago, the Kaiser Wilhelm der Grosse, the finest steamship then afloat, steamed into Southhampton bearing a placard so large that all England might read,—"Made in Germany," the nations of the earth lifted their hats and said "sublime." And now "Made in Germany" usually bears testimony to a high grade of skilled labor.

All the leading countries of Europe have fostered agricultural education. To show the influence of education and an advanced state of civilization on the productiveness of a country, we have but to compare the annual yield of mother earth in such countries as Turkey, Greece, Italy and Spain with that of Germany, France and England. In the former countries the soil has been growing poorer for centuries. We know from the population that Italy and Greece maintained at one time, that their land must have been very productive.

But in Germany, France and England the land is growing more productive every year. As compared with their condition three hundred years ago, the change for the better is very great. The economic benefits derived from their agricultural schools have been very gratifying. England spends less by far than either of the other countries, yet with an area of but one-fourth larger than the state of New York, she expends over $400,000 annually for technical instruction in agriculture. The experimental work carried on by Gilbert and Lawes for more than half a century has been of the first importance, not only to the agricultural interests of England, but to the entire world. We could say the same for much of the work done in both Germany and France.

Industrial education is destined to be the prominent factor during the next century in the amelioration of the masses. It goes hand in hand with the scientific spirit of the times.

HIGHER EDUCATION AND THE PEOPLE.

H. C. ADAMS, UNIVERSITY OF MICHIGAN.

No one can regret more than myself the enforced absence of Dr. Angell, President of our University, to whom this paper on the "Higher Education and the People" was assigned in the program as originally drawn. It is evident this topic should receive consideration in order to round out the educational feature of our program, which explains why I have consented, at the last moment, to say a few words respecting it. The topic is of peculiar significance when discussed before a Michigan audience. This State stands committed to the policy of public education and gives to the phrase a broad and comprehensive meaning, including not only what is technical and general, but the idea of popular education as well, for it is no misuse of language to include the farmers' institutes as at present organized and conducted within the educational system of the State. It is an interesting fact that at this, the joint meeting of the farmers' institutes and the Michigan Political Science Association, every phase of this subject receives either direct or indirect consideration.

In discussing the relation of higher education to the people I shall undertake no extended definition of higher education. It is a term which changes its meaning from time to time in order to meet the changing needs of the community. As used in the present discussion, it includes both the general and technical instruction offered by colleges and the research carried on by instructors in these institutions. This last point seems to me of great importance, for under existing ideas relative to education, an institution of higher learning must be a center for investigation as well as a place for instruction. The extension of knowledge is as truly a function of universities as is the imparting of that knowledge. The true teacher must be an investigator.

Thus defined the relation of higher education to the people may be considered from three points of view. These are as follows:

First, The point of view of those who seek an education;

Second, The point of view of those who make use of the services of experts and professional men trained at the college or university;

Third, The point of view of the political, social and industrial conditions which are in large measure the product of higher institutions of learning.

So far as the individual student is concerned, very little can be said upon the topic in hand. Were the question of education entirely, or even primarily, a personal question, there would be no answer to the argument that he who is benefited by the instruction ought to pay for it. But this assumption does not present the matter in its true light. Our society is a complex affair. Each class depends for its prosperity upon the prosperity of other classes. The life of each individual is bound up with the life of all. Such being the case the advantage of an education to the individual cannot present the point of view from which the question of the relation of the higher education to the people can be reasonably discussed.

There is, however, one observation relative to this aspect of higher education of peculiar significance to us in Michigan. It is a matter of no slight importance to the citizens of this State that the highest in education lies open, and practically free, to any one who desires to avail himself of its advantages. Under such conditions education can never result in the establishment of a class. It can never get very far from the needs of the people. It can never become an aristocratic affair. From the primary school to the university, the opportunity of securing an education lies open to every citizen of the State. Were it not for the constant recruits from all classes of the people, the University, and I doubt not, also, the Agricultural College, might as well close its doors. Statistical data in support of this statement might be submitted were that necessary, but I leave this phase of the subject to what seems of relatively greater importance, namely, the general and social advantages of maintaining higher institutions of learning.

The second point of view from which the relation of higher education to the people may be considered pertains to the character of the service rendered by the men and women who receive collegiate and university instruction. The range of knowledge at the present time is so broad that no one person, however gifted, can become its master. Specialization is the rule in all progressive life, and the degree to which specialization is carried may be accepted as a measure of social advancement. The product of successful specialization is the expert. It may be that the motive which leads one to become an expert is the hope of personal advantage which knowledge gives, but it would be a mistake to assume that this advantage stops with the individual who by study becomes an expert. Indeed, we do not begin to measure its importance until we appreciate the extent to which it is used by the public at large. We are apt to overlook the fact that it is impossible to develop an expert of high efficiency without raising its general plane of excellence in the class to which he belongs. An expert physician, for example, is only possible upon the basis of a highly developed science of medicine. Such a physician must avail himself of the thousands of experiments in the many laboratories scattered throughout the world. Each laboratory makes its contribution; each publishes its discovery. As isolated facts, these contributions and discoveries are of slight importance, but, correlated with the contributions and discoveries of other laboratories, they build up a body of useful knowledge which, in the hands of a skilled physician, permits not only the alleviation of pain, but the control of diseases before regarded as a sentence of death.

Citizens of Michigan, may contemplate with pride this phase of our argument, for no medical school in this country, and few in Europe, have made more positive or helpful contributions to the science of medicine, during the last quarter of a century, than the one which our State supports. One or two illustrations of what the development of the science of medicine has done in recent years may not be inappropriate.

Diphtheria used to be one of the most dreaded of diseases, and well might this be the case. Before the discovery of modern treatment fifty cases in a hundred terminated fatally; at present the ratio of mortality is ten in a hundred. In the matter of milk and milk poisons, there has been wonderful advance in recent years. The record of fourteen hospitals in the city of New York shows that, in the case of children brought for

treatment suffering from summer complaint, the average rate of mortality has been reduced from 85 per cent to 50 per cent. I might continue such illustrations without number, but these mentioned are adequate to show that technical excellence on the part of the physician is of more importance to the patient, and to us who are friends of the patient, than to the physician himself. The individual practitioner may be satisfied with a degree of excellence just above that of his competitors, for that would enable him to obtain the highest fees; what society wants, however, is a high plane of excellence on the part of all practitioners. If this be true (and the illustration applies equally to all expert and professional knowledge), the people at large are more vitally interested in the maintenance of higher institutions of learning, the product of which is a high level of professional excellence, than are the persons who attend those institutions.

If such a view of the case be conceded, the question of the relation of higher education to the people is thrown into a newer and a truer light than when regarded from the point of view of those who receive instruction. The State, whose function it is to guard and develop the interest of the entire people, is not called upon to apologize for the expenditure of so much money as may be required to place at the disposal of the humblest citizen the advantage of expert training. The people are interested in maintaining experiment stations in all branches of useful knowledge. It may of course be objected that investigation and research are not a proper function of institutions founded for instruction. To this I can only make reply, that, speaking generally and with the sanction of the history of civilization, the research which has blest the world has emanated from the universities. When institutions of higher learning cease to investigate and content themselves with teaching simply what the world already knows, the development of civilization will be arrested; the world will have entered upon a period of retrogression and decay. I know of no other way by which the direct interest of the body of the people in higher education can be more clearly expressed. These educational institutions are a part of the social order. They perform a function essential to the welfare of society. They render a service direct or indirect to every member of the community.

Turning now to the third point of view from which higher education may be regarded, it is incumbent upon us to consider the general as distinct from the particular services rendered by higher education. This has been foreshadowed in what has already been said, but it is capable of more definite expression by means of a few specific illustrations.

Upon what, let us ask, in the first place, does industrial prosperity depend? Speaking broadly, I reply, it depends upon the character of the soil, and of the climate, and upon the possession of raw material for manufacture. It depends also upon the safety of property and the security of contract. It depends, finally, upon the intelligence of the people which enables them to make use of natural opportunities. It is the third of these conditions of prosperity which places emphasis upon education. Intelligence has always been regarded as essential for effective labor. In medieval times, when men used tools, industrial training was secured by means of a seven years apprenticeship in whatever trade or craft was chosen, a fact which goes far towards explaining the wonderful handwork that has come down to us from the thirteenth and fourteenth

centuries. At present tools have given way to machinery, and ability to invent new methods of production and to direct large aggregations of labor have come to be of prime importance in the maintenance of industrial efficiency. Consider this, for a moment, on the side of invention. A hundred years ago inventions were more or less accidental. The thought that nature could be conquered by patient study, and her forces harnessed to the treadmill of industry, thus making possible the emancipation of mankind from excessive toil, was not included within the range of practical thinking. Contrast such a state of mind with the present point of view. Invention is now a profession. The Bell Telephone Company, for example, which, whatever we may say of it as a monopoly, has conferred inestimable benefits upon the community, has upon its payrolls the names of men who are trained in the sciences and the arts, all of whose time is spent in the laboratory with the view of perfecting this means of transmitting thought. This is not an isolated case. Every branch of industry has its experts. No industry can continue to be progressive without its experts, and if we admit that the modern system of industrial organization based upon machinery is of advantage to the world, we cannot evade the conclusion that the higher institutions of learning which train these experts are an essential factor in establishing and maintaining our present industrial efficiency. Inventors are as important to the preservation of industrial prosperity as is the physician to the preservation of health, and when each man, whatever his business or occupation, appreciates to what extent his personal success depends upon the maintenance of general prosperity, he is forced in courtesy and in honesty to acknowledge a debt of obligation to that educational system which includes within its curriculum scientific training for investigation. Without our schools, not only would further progress be arrested, but we should soon lose the general intelligence necessary to avail ourselves of the technical progress already made.

The same conclusion would be reached were we to consider the importance of efficient management. No man today can work alone. The principle of division of labor is of universal application. This is only another way of calling attention to the importance of organization; and it goes without saying that if a thousand men are to work together they must work under the direction of a single head, and that their efficiency as a working body depends upon the manner in which their labor is directed. But ability to manage a great industry comes not by birth; it is the result either of experience or of technical training. If learned in the school of experience it is the public that foots the bill because it is the public that finally must bear the burden of mistakes and failure. It is far cheaper for the public to provide schools for the training of men into whose hands may be placed the management of great industries. Is it not then evident that in business as well as in the professions, the demand for training is primarily a public demand, and that the body of the people, whether looked at from the point of view of organized workers seeking direction or from the point of view of the consuming public, have the most direct and imperative interest in maintenace of those institutions which give the needed special training? Such considerations as these suggest what I believe to be the true relation between higher education and the people.

Were further illustration of this sort necessary I might refer to the

industrial history of Germany, whose recent commercial importance rests directly and avowedly upon her educational system. She has developed more extensively than any other country facilities for commercial and technical instruction. In England, also, it is coming to be recognized that the continuance of commercial supremacy depends upon the development of educational facilities; while in the United States, the necessity for commercial and technical education is forced upon the universities and colleges by the desire on the part of manufacturers to secure standing in the world's market. Our own University has established such a course in higher commercial education, and the interest which business men have evinced in this course indicates that they appreciate the importance of trained intelligence in commercial affairs. To make this illustration tell upon our argument it is of course necessary again to remind you that the permanent success of one class, or one interest, is impossible unless it be accompanied by the success of all classes and all interests. The success of the agricultural interest, for example, is bound up primarily, with the development of a home market for agricultural products, and it is a truism to say that the limit of this market is the prosperity of those members of the community not engaged in agriculture.

My next illustration of the general advantage of higher education to the community calls to our attention the changes which are rapidly taking place in the conditions of rural life. In medieval times agriculturists lived in little communities going from their homes each day to work upon the land. Whatever we may say of the advantages of intercourse which such a system permitted, it had the decided disadvantage of restricting the land that could be tilled. The farmer of our own time, on the other hand, accustomed as he is to the use of machinery, requires a large amount of land for cultivation, and this necessitates that he and his family live upon the land cultivated. I need not dwell upon the isolation incident to this method of cultivation, or upon the fact that school and church privileges, as well as all those social amenities which make life pleasant, are far from propitious. At present, however, there seems to be some hope of relief. Certain changes are taking place which promise much for rural life. I refer to the extension of electric lines through country districts, to the establishment of local telephone service, to the wide dissemination of electric power, to the rural mail delivery, and the like. The social possibilities bound up in the full development of these enterprises, as well as others of the same class that might be mentioned, lie beyond the power of the imagination to grasp. We are, I believe, upon the eve of far-reaching changes in the conditions of life in rural communities. Such a remark of course lies within the realm of speculation, but it is reasonable speculation. I look confidently for the time when social intercourse and manufacturing on a small scale will be restored to rural communities; and, when this shall have been accomplished, the country rather than the town will offer the opportunity for sensible living. To whom will the country be indebted for the realization of so bright a picture? The question is answered before it is asked. The tendencies to which reference is made is one of the many blessings bound up in the development of science. It is the professor who, with his students, works patiently within his laboratory at the occult problems of electricity and other mechanical agencies to whom must be granted praise for having rendered this change possible; and yet he is not entirely responsible, for with-

out the generous support of the people, thus giving him the opportunity of investigation and instruction, he would be unable to devote his life to such a service. Thus, ever do we come back to the idea that the higher institutions of learning, under which we include research as well as instruction, are of primary, nay of essential importance to the great body of the people.

My third illustration is of an entirely different sort. It may be urged that all that has thus far been said pertains to physical science and not to general culture. It is doubtless easier to illustrate the popular advantage of higher institutions of learning by reference to the physical sciences and mechanical inventions, than by referring to what is sometimes called the culture studies, but one cannot conclude from this that the people at large are not interested in those departments of colleges and universities which concern themselves with literature, music, history, philosophy or politics. The physical sciences of minister to the conditions of life; these other branches of learning minister to life itself. There are many ways in which studies of this sort spread their blessings to the community even though (which I trust may not always be the case) they are followed by comparatively small numbers. Ask yourselves seriously the question, what it is you desire from your clergymen, your teachers, your statesmen, and you will be forced to recognize that these studies, sometimes called culture studies, are in reality professional studies for those who undertake to serve society in the manner suggested. Consider this suggestion for a moment, from the point of view of the clergyman. I know of no professional class which stands in greater need of a broad and comprehensive education. Especially is this true when we recognize to what an extent the spirit of social service has entered into the life and activities of the church during the past twenty-five years. It is a most encouraging fact that this great institution—the peculiar guardian of the principles of religion and morality—should recognize the importance of the social as well as the personal application of religious principles. The church is coming to regard itself as the center from which the inspiration to a higher, social and political life should emanate, rather than as a haven to which men may flee from the contaminating influences of an evil world. If, however, the Church is thus to serve as a center of positive influence in the community it must touch the community at all points. The clergyman must be able to see how good roads are related to right living; how manual training and technical education bear upon the moral life of the boys and the girls; how charity is related to poverty; how industrial organization is but a phase of social organization and carries with it a moral influence; how the circulation of good books may result in fruitful thinking and healthful living; how through clubs for the young and societies for the old, the roof of the church may be brought to shelter the pleasures of the people as well as their worship, and how all these agencies may be made to exert a positive influence for righteousness in the community. This is easy of statement, but it is difficult of execution. The clergyman under this newer and broader interpretation of his functions is nothing less than a social engineer, and if he is to perform these functions with efficiency and grace, it is imperative that he understand the complex and intricate machine which we call society. You appreciate the importance of a technical education which results in making civil and mechanical engineers, because you recognize the industrial and commer-

cial bearing of their work. Is it not reasonable to place as high an appreciation upon the education of social engineers who are dealing, not with the conditions of living, but with life itself? An affirmative reply to this question, or indeed any sympathy with the line of reasoning thus suggested, is an acknowledgment of the social importance of a general and comprehensive education on the part of those who have to do with the moulding of life. Indeed from this point of view I should almost be willing to say that the so called culture studies are professional studies. We at least find a fundamental reason why they should continue to be nourished by a higher institution of learning.

This phase of the subject might be further illustrated by referring to the work of the teacher, or to the nature of the public service rendered by those who make our laws. I pass this, however, in order to call your attention to a yet more fundamental relation which higher education bears to the interests of the people. You have doubtless heard the question frequently discussed whether our democratic form of government is likely to stand the strain of commercial prosperity. You will not, I trust, convict me of lack of faith if I say that the pessimist who prophesies the destruction of our popular institutions can point to many tendencies which seem to give support to his doleful conclusions. Without undertaking to analyze the situation or speak critically of these tendencies, it may be appropriate to call attention to the fact, that the side of this interest there should flourish other interests and other aims to the end that our magnificent industrial organization, which is the wonder of history, should not in the end crush out the ideal of high living. It thus becomes the task of universities not only to minister to industrial advancement but to enable technical advancement to minister to the life of the people. He who appreciates the social significance of true culture cannot fail to understand the intimate relation which exists between the higher education and the life of the people. I close, then, with the remark that institutions of learning which add to technical instruction and research, the spirit of culture and of attainment, render a direct service to the community in that they provide relief from the intensity of the demands of commercial life. From whatever point of view we look at education, it is the people who are the chief beneficiaries, partly because of the use they make of expert training, but primarily because of the influence which education exerts upon the form and spirit of society which touches the life of the individual at every point.

THE DECREASE OF RURAL POPULATION IN THE SOUTHERN PENINSULA OF MICHIGAN.

DR. CHAS. H. COOLEY, UNIVERSITY OF MICHIGAN.

It is very well known that the proportion of the people of the United States that live in cities, as compared with those who live in the country or in small towns, is quite rapidly increasing. The census classifies as urban that part of the population which dwells in cities of more than 8,000 inhabitants. The per cent dwelling in such cities was 4.0 in the year 1800. In 1880 it had become 22.6, in 1890, 29.2, in 1900, 33.1. It is worth noting that the cities did not gain quite so much upon the country during the last decade as they did during the one preceding. The urban percentage increased 6.6 between '80 and '90, but only 4.1 between '90 and 1900.

About the same is true in a general way in Michigan. Our per cent of urban population was 16.8 in 1880, 31.2 in 1890, 37.2 in 1900. Here again the gain of the cities is less during the last decade.

This method of comparing city with country population is not altogether a fair one, for this reason: even if all parts of the population increased at precisely the same rate, the selection of a fixed limit, like 8,000, to separate the city from the country would always make the former appear to be increasing more rapidly than the latter, because a larger number of towns with a little less than 8,000 would be continually passing that mark and so coming all at once to be reckoned as urban. A better way is to take a particular list of cities and follow them from one census to another, comparing their growth with that of the rest of the population.

Thus if we take the 161 cities that now have over 25,000 people and trace their progress we find that they increased 49.5 per cent between '80 and '90 and 32.6 per cent between '90 and 1900. During the same periods the population of the country at large increased 24.9 and 20.7 per cent. Here again we see that although the large cities are still growing faster than the rest of the country the difference is not as great as it was in the preceding decade. About the same relations hold true in our own State. The growth of our five large cities, Detroit, Bay City, Grand Rapids, Saginaw and Jackson, fell from 85 per cent to 30 per cent; while that of the State fell only from 28 to 16. On the whole we may perhaps conclude that the aggrandizement of great cities is not quite so alarming as is sometimes supposed, and not relatively so rapid now as it was some time ago. I may add that the census shows that very large cities are increasing no more rapidly than those of moderate size. The rate of increase 1890-1900 for each of the four classes of cities above 25,000 is almost precisely the same,—about 33 per cent.

Let us now turn our attention to rural population, first in the country at large and then in our own State.

The general fact is that the population of settled rural districts in the northern states is actually diminishing, and has been for twenty-five

years or thereabouts. This can be realized most vividly by inspecting a map prepared by the census of 1890 upon which all counties within which the rural population diminished between '80 and '90 are colored yellow. Towns having less than 1,000 population are reckoned as rural, and the inclusion of these probably saves many counties from showing a decrease which would show one were all the villages excluded. The result, however, is sufficiently striking. It is not generally known, I imagine, that upon 66 per cent or two-thirds of the area of the state of Illinois population actually fell off during that decade. In Iowa the per cent of surface showing a decrease was 43, in Ohio 61, in New York 83, in Michigan 27. Wherever the rural population of states which were thoroughly settled in 1880 did not fall off there is usally some special cause at work, which can often be assigned even by a casual student of the map. Thus the increase of rural population in counties adjoining great cities is doubtless due largely to the increase of suburban residences and of market gardening. The only reason that Michigan shows so small a surface upon which rural population diminished is that only the lower part of the southern peninsula was opened to agriculture previous to 1880.

Up to this point I have made use only of facts which can be obtained directly from the census publications; but in attempting a somewhat more detailed study of the movement of rural population in Michigan I have had to go behind the face of the returns and make some simple calculations the results of which are not quite so well known.

There are twenty-eight counties in the four southern tiers of counties in this State, that is beginning with the row counting Kent. In twenty-three of these, or all but five, rural population diminished between '80 and '90. These five were Kent, Allegan, Ottawa, Wayne and Berrien. This line, running across the State from Grand Haven to Port Huron seems to correspond roughly with the limit of that part of the State that was well settled agriculturally previous to 1880. North of this only one county—Montcalm—suffered a rural decrease during the decade in question.

The census of 1900 has not yet published exhibits showing separately the movement of rural population; but by going over the general bulletin relating to the population of this State I have been able to pick out the facts with sufficient accuracy. In the four southern tiers of counties the decrease shown to have taken place between '80 and '90 has continued, all but six of the counties considered above have fallen off in the decade just ended. Of the six whose rural population increased, three, Ottawa, Wayne and Berrien, were among those that showed an increase before. Kent and Allegan have fallen off. The new counties showing an increase are Ionia, Van Buren and Monroe.

It would be interesting to find out if possible just why certain counties offer an exception to the rule, and with reference to this plausible suggestions at least readily present themselves. Of the eight counties which show a rural increase during one or more of the two decades—Kent, Allegan, Ottawa, Wayne, Berrien, Ionia, Van Buren and Monroe—Kent and Wayne contain our two large cities, and the increase in them is probably due to the growth of suburban residence and of market gardening; Allegan, Ottawa, Berrien and Van Buren are counties on the coast of Lake Michigan and contain large fruit districts; Ionia, I

understand, has also become to some extent a fruit raising region. Mr. Butterfield, to whom I am indebted for suggestions regarding this point, thinks that the increase in Monroe county may be due to the growth of the dairy in that quarter.

Possibly all of these cases of rural increase in the southern part of the peninsula may be ascribed to one general cause, namely, the beginning of a more intensive agriculture.

Of the twenty-two counties in this region whose country population diminished during the last decade ten show a total diminution, that is a diminution that remains after the towns are reckoned in, while twelve are saved from this by the growth of their towns. Monroe county is a case, unique in the well settled part of Michigan, where the rural population has increased while the towns—Monroe and Dundee—have fallen off.

If now we turn to the counties north of the row containing Kent we find that Montcalm lost in rural population during the last decade as it did during the one preceding, and that several other counties are added to the list, namely, Mecosta, Newaygo and Lake, Oscoda, Crawford and Roscommon. Probably two sorts of causes are at work here. Mecosta and Newaygo are agricultural counties and their loss may be due chiefly to the same forces as are at work farther south. But Lake, Crawford, Oscoda and Roscommon are sparsely settled, and it seems more likely that the people who have left them were dependent in some way upon the declining lumber industry, and not properly a farming population.

In the northern part of the State we also find a number of counties in which the decline of the lumber manufacture, accompanied by the increase of agriculture, has apparently caused the towns to lose in population while the country gained. Tawas, Oscoda, St. Ignace, Ludington, Muskegon and even Saginaw, have lost somewhat, while their counties—Iosco, Mackinac, Mason, Muskegon and Saginaw—have nevertheless increased.

The question of the tendency to growth or decline of small rural villages containing less than 1,000 persons is one of some interest which I do not think has ever been brought out in census reports. I find that of 165 incorporated places in this State having a population of less than 1,000 in 1890, 101 gained population during the last decade while 63 fell off and one remained unchanged. It would appear, then, that while the growth of these places is by no means universal they do not, on the whole, show that tendency to an actual diminution exhibited by the strictly rural population.

In order to get a little nearer view of the matter I have made a more detailed study of the movement of rural population in Washtenaw county. This was one of the first counties to be settled and its conditions are perhaps in a general way typical of those of the older agricultural districts of the State. It contains one flourishing city of about 15,000 inhabitants which gained more than 50 per cent during the last decade, one city of about 7,000 not quite so flourishing, which gained 20 per cent, and five villages of from 500 to 2,000 which gained in the aggregate about 8 per cent. Only one of these showed a decrease.

The county has twelve townships that are exclusively rural, that is they contain no villages of any sort. I have prepared a table showing the movement of population in these from 1850, at which date they were fairly well settled, down to 1900; and it seems to me of some interest.

RURAL TOWNSHIPS OF WASHTENAW COUNTY, MICHIGAN.

Township.	1850.	1860.	1870.	1880.	1890.	1900.
Augusta	808	1,140	1,470	1,640	1,789	1,739
Bridgewater	1,147	1,290	1,379	1,255	1,084	1,011
Fredom	1,215	1,316	1,261	1,373	1,134	1,013
Lima	912	998	1,052	1,021	991	961
Lodi	1,234	1,319	1,344	1,377	1,264	1,121
Lyndon	901	821	823	735	617	665
Northfield	1,116	1,373	1,300	1,273	1,210	1,266
Pittsfield	1,232	1,331	1,121	1,233	1,158	1,050
Salem	1,343	1,359	1,216	1,192	1,182	1,158
Sharon	868	1,000	1,087	1,161	1,014	984
Superior	1,127	1,346	1,268	1,253	1,096	1,039
Webster	924	1,106	974	969	863	747
Total	12,827	14,419	14,295	14,482	13,382	12,754
Increase		1,592	-124	187	-1,100	-628

Between 1850 and 1860 all of them increased in population except one, and the total increase was about 1,600. During the following decade six of them gained and six lost, but there was a net loss of about 100, which was undoubtedly due to the civil war. Between '70 and '80 there was a small net gain of about 200, notwithstanding the fact that seven out of the twelve lost. The census of 1890 showed that a general falling off had set in. All of these townships but one diminished in population and the net loss was 1,100. This movement continued during the decade just past, but with some abatement. Only two townships gained and the net loss was about 600. At the present time the total population of the twelve townships is 12,754, a little less than in 1850 and twelve per cent less than the maximum of 1880.

Thus if one should draw a curve representing the history of population in these townships, this curve would rise rapidly between '50 and '60, fall slightly between '60 and '70, rise again slightly between '70 and '80, and after that fall continuously, though at a rate that diminishes as we approach the present year.

It is possible, though it would be rash to assert it as a fact, that Washtenaw county is in some measure representative, as regards these changes, not only of southern Michigan but of the northern United States west of the Mississippi. Some time ago, before the results of the census of 1900 were available, I examined the movement of population in ten rural townships of Connecticut, taken from different parts of the state, and ten from New York, taken in like manner. The result was much the same as in Michigan, except that the decline seemed to begin a little earlier. There was an almost universal falling off between '80 and '90, only one of the twenty townships showing an increase. There was a

pretty general increase in the decade preceding the war, and a general decrease in the decade including it, but between '70 and '80 the movement was slightly downward, instead of slightly upward as in Washtenaw. The maximum of rural population in these more easterly districts would appear to have been reached about 1860, while in Michigan there is reason to think that but for the war the increase would have continued until about 1870.

The reasons for this diminution of rural population are not very hard to find. Much has been said of a mad rush to cities, and the movement has often been spoken of as if it were altogether a kind of dissipation, like going to the saloon. But if there were no solider ground for the migration than this we should find the migrants plunged into pauperism and vice after they get to the cities, instead of pursuing useful and remunerative labor as is ordinarily the case. The real causes of the decrease of rural population are chiefly economic, and so familiar that I need only mention them. They are:

1. The improvement of farm machinery enabling the same work to be done with one-half or one-third the number of hands it would have required twenty years ago, and

2. The facility of transportation and communication enabling trade and manufactures to concentrate in the large towns.

The first of these changes has diminished the number of men needed upon the farm, the second has brought the farmer into more direct relation with the city consumer and producer and partly taken away the function of the small local dealer and manufacturer.

Are we to expect this decrease to continue or is it nearing its limits? The answer to this question must be somewhat speculative, as depending upon conditions which we cannot foresee, but it seems to me that there are several plausible reasons for holding that the movement is likely to cease.

In the first place it seems to be slowing up already. In Washtenaw county at least it was only about half as great during the last decade as during the one preceding.

In the second place there are economic reasons why it should slow up and eventually cease. Farming is already becoming more intensive, aiming to get more out of a given area of land by putting more thought and labor upon it. This tendency must evidently continue as the population of the country increases and the new land available for agriculture disappears. Already, as we have seen, certain kinds of intensive agriculture, such as fruit, garden and dairy farming, have caused a growth of rural population in certain parts of the State. If there is anything in political economy it would seem that we must be about to enter upon a period of higher land values and more thorough culture.

Thirdly, the social attractiveness of the country is increasing, and will continue to increase. The great social drawback of the country has been isolation, as hurry has been and is the great drawback of the city. Now nothing seems clearer than that isolation will nowhere be excessive during the twentieth century. Good roads, electric cars, the telephone, the bicycle and free delivery of mail are already making this reproach a thing of the past; and these facilities of intercourse are sure to stimulate every kind of rural social organization.

Indeed the increasing press of life will probably render the elbowroom

and partial retirement of the country more and more enticing even to those whose business is in the cities. The desire to avoid the crowd has always been conspicuous among Anglo-Saxons, and in England leads to a widespread preference for country life on the part of the educated and well-to-do people. In our own eastern states, the maintenance of country houses is becoming more common, and it seems likely that when good roads and other improvements have made rural life a little more convenient a considerable movement away from the cities, on the part of those who can afford it, will set in all over the country.

Living upon one's own land has attractions for the human mind and benefits for the human character that can never disappear, and is above all others the thing that the city man envies the farmer. The instinct of possession is perhaps the deepest instinct we have, and the man who owns and works land can gratify it more visibly, more tangibly, more wholesomely, perhaps, than the man of any other class, rich or poor. He is master of himself and of his immediate environment as no man can be in the city, and he may hope to transmit this mastery to his children's children.

Hon. H. R. Pattengill was called upon to discuss the educational topics that had been presented, and he said: "I have been extremely pleased with the papers that have been presented by President Snyder and Prof. Adams. I had planned to be today at an important meeting of educators in Chicago, but the moment I saw the program of this splendid meeting, I decided that I would have to stay away from Chicago at least another day.

"I am rejoiced especially to note the trend of the papers that have been read, and their broad and catholic spirit. There is scarcely anything in them that I can criticise, and perhaps little that I can add. I saw recently a huge piece of machinery made in one of the principal manufacturing cities of Michigan shipped to the Clyde works in Glasgow, Scotland. I asked if that were not an unusual thing, and I was told, no, that that complicated and expensive piece of machinery is in use in scores of huge machine shops in Great Britain and Europe. I asked myself, how does it happen that America, this young nation, is today the industrial pier of any nation on earth. A good many might say it is due to our natural resources. But look a moment. Africa has many of these wonderful resources of soil, of climate, of minerals and of forests; but Africa lacks one thing that America possesses, what Whittier calls 'the riches of our commonwealth, the cunning hand and cultivated brain.'

"I like also the reference to the fact that teachers must be investigators, for, as a matter of fact, investigators are also teachers, and even the man who spends his time in research ought to be able to inspire people to love science and art. But the teacher is even more than an investigator, the teacher is a character builder.

"Another idea advanced that I like is that the university of today is not content with teaching merely the old things. A man who helps mankind certainly ought to be as proud of it as the man who knows the antiquities is proud of his knowledge. So I am glad that the universities are so practical and helpful to mankind, for what is their work if not to be helpful. Prof. Paul Hanus of Harvard says: 'The chief end of education is to make people useful and happy.' I believe in that doctrine. We must make people not only happy but useful, and not only useful but

happy; the two things must go together. So I say that the liberal and general education of the masses of our people is what has helped to make our country great and prosperous.

"I want to dwell a little longer upon this idea of the usefulness of education as combined with the culture value of education. It is possible that we may over emphasize the useful. As Dr. Adams has remarked, we ought to put equal emphasis on the culture value of education. So many people in this world live only up to the neck. We want happy homes as well as useful homes. We want the useful because we have no need of the millionaire tramp any more than of the pauper tramp. I am a thorough believer in a practical education, but we must train the boy to be a good thinker as well as a good actor. Some people say, 'why should my boy study geometry and algebra and all that sort of thing, he will never use it?' The question is not so much what the boy will do with it, but what it will do with the boy. We need men who can think logically and clearly. Most of us are lazy in our thinking. We want our thinking done for us. We don't reason well. A good deal of reasoning is like that illustrated by the idea that at Kalamazoo they have an insane asylum and also grow celery. Up at Newberry they have an insane asylum and also grow celery; therefore, wherever they grow celery is a good place for an insane asylum, and wherever is an insane asylum is a good place to grow celery. This looks like an exaggeration, but lots of thinking is just as reasonable. A student properly trained has the power to think, has the habit of thinking, and it is this habit of thinking that is practical. It does not make any difference how the boy acquired this power, whether it was through geometry or agriculture; the power to think is the great end of education. I am glad that I have a strong right arm, but now it does not make any difference to me how I got that strong right arm, whether it was hoeing corn or rowing a boat. If I had my way, I got it by rowing a boat, if my father had his way, I got it by hoeing corn; but the chief thing is that I have got it and I can use it for anything I want to. So with the power to think. Thus while I like the idea that schools must fit for bread and butter earning, they must go further than that and give good broad training, and this broad training must be open for every boy and girl in the land, poor and rich, and the poor especially. We must have such educational advantages that the boy in blue jeans and the girl with the checkered apron may have the opportunity for the best and broadest education."

Dr. Kedzie responded to a call for a few remarks by a characteristic story.

TUESDAY EVENING.

CHANGES DEMANDED IN THE EDUCATIONAL SYSTEM OF RURAL COMMUNITIES.

HON. L. D. HARVEY, SUPERINTENDENT OF PUBLIC INSTRUCTION, MADISON, WISCONSIN.

It is well at the outset to consider the conditions of education that now exist in our rural communities. Are they what they ought to be? Are they what the boys and girls of the country districts have a right to expect? Are they such as will fit these boys and girls to meet the problems of life?

I take it that in general we may say that these conditions are not what modern life demands. I do not know just what your situation is here in Michigan relative to this question, but I am fairly familiar with conditions in Wisconsin, and I suspect that the two states are much alike in this respect. I have no hesitation in saying that judged by our Wisconsin conditions, the rural schools are not offering the opportunities to boys and girls that the twentieth century demands.

I know that it is frequently said that the great leaders in the city came from the country and the argument is made that, therefore, the country schools are responsible for these great men. We look at some noted examples of wonderful success, and argue that this success is due to the little red schoolhouse. This is an example of the false logic that my friend Pattengill spoke about this afternoon. I say that this success has not come because of the little red school house, but in spite of it. I will admit that our great men, most of them, have come from the country, but I claim it is not necessarily the schooling they received in the school house that is responsible for their greatness, but the conditions of country life. The hard work, the necessity for saving, the learning to be industrious, and all that sort of thing.

As I said, I am somewhat at a disadvantage, because I do not know familiarly your Michigan conditions, but over in Wisconsin we have nearly 1,000 schools, each of which has an attendance of ten pupils or less. These schools have the lowest paid teachers that can be obtained. Now these two things, small schools and low paid teachers, are very important factors in the quality of teaching. Take the matter of small schools. Even the best teacher cannot succeed with a small school. Every educator agrees that you must have pupils enough for emulation. You have got to have a school spirit. You have got to have enough enthusiasm in the school to encourage the teacher to do her best; but in a small school the teacher is bound to deteriorate, it cannot be helped. So these two worst conditions—small schools and poor teachers—confront us. I don't mean to say you look for poor teachers purposely, but you can say to yourselves, "we have a small school and we cannot afford any but cheap teachers," so you hire the cheapest teacher you can find.

Now the problem is how can better conditions be brought about. I regard it as fundamental that we must certainly change these two conditions. In the first place, we must wipe out of existence the small schools

of five, eight or ten pupils. I advocate this not in the interest of teachers or educators, but in the interest of the pupils. Sometimes farmers say to us when we advocate this idea, "you are planning to take away from us the schools of which we are so proud." Are you proud of such a school as I have described? Go into one of these small schools with a cheap teacher and see the work done. Send your boys and girls who have been attending these inferior schools to some school of high grade, and see how low your children will rank in comparison, and then answer me. This sentiment of pride is a worthy sentiment, but it is a mere sentiment when it cries out against the removal of the small school. I am glad that you want a school that you can be proud of, but you ought to have a school that is worth being proud of. Even on the dollar and cent basis, it is a mistake to keep up the small school. It is the most costly school. Some of you may say, remove the small school and you remove the educational advantages for our children. Not at all. It used to be the cry, "take the public school to the children;" today we say "take the children to the public school."

You can never have an effective system of public schools in rural districts or anywhere else unless you have a core of centralization in it. You must have power lodged somewhere.

Now if we have centralization, we have, of course, to provide for getting the pupils to school from long distances. The solution of that problem is to have them transported. You may say it cannot be done. That is what they are talking all over Wisconsin, but I notice this fact. Wisconsin is a great dairy state. We have multitudes of creameries, and I notice that every week-day morning in the year, the farmers of Wisconsin with the utmost regularity manage to get their milk cans to the butter factory; while these same farmers are the men that say they cannot get a boy to the man factory. But we have the facts on our side. Twenty states of this union have tried transportation in a greater or less degree. These twenty states contain half the population of the United States, and the testimony of these states is unvarying in favor of the plan. There has been an increase of attendance in these centralized schools of from 50 to 100 per cent, and this too without an increase of a dollar's expense. This proposition for centralization is in the interests of your children, for it closes up inefficient schools, and makes a strong, efficient central school.

My second point was that we need better trained teachers. How shall we get them? We educators keep urging the necessity of the preparation of teachers, but we cannot meet the argument of the timid little schoolma'am who says faintly, "how can I afford it." Indeed, how can they afford it? Can you expect a graduate of a college or normal school who has spent hundreds and possibly thousands of dollars in getting prepared for teaching to teach for $25 a month for seven, eight or nine months a year? As business men you cannot expect it. You would not do it yourselves, and teachers trained in this way don't have to do it. There are plenty of positions in city schools awaiting them, so the country schools have to take up with teachers from the high schools. Many of these have the making of good teachers, but they are without preparation.

Over in Wisconsin this great and crying need for better trained teachers for country schools has forced itself upon our attention. We have found that though we have seven normal schools, which we regard as good as any in the land, their graduates do not go to the country schools.

We have teachers' institutes, and they are good so far as they go; but these things have not solved the problem, so what we are trying to do is to establish country training schools for teachers. Two such schools have been in existence two years, and by next fall we will have six. Each one of these schools is for a single county and admits students only from that county. Each school gives a year's course of study in the art of teaching. The county furnishes the books. Many of these pupils live at home and drive to the school every day. Most of the schools are located in towns where board and lodging are obtained at a low figure. The schools give training in the common school branches, and aim to fit teachers for country school teaching. The experiment has gone far enough to prove to us beyond all question that the plan is a success. In the two counties where the schools have been established for two years, the schools are supplying enough graduates each year to fill the needs of those counties, and the boards of education now appreciate the value of this training, and actually will not employ any teachers for the district schools unless they are graduates of these normal training schools. In other words, the normal training school of the county is supplying all the new teachers for the rural schools of the county. These counties have the best class of teachers they have ever had.

We are also trying in Wisconsin to consolidate schools. The legislature makes a grant directly to graded schools that are not connected with high schools. We have established 280 such schools recently. As an inducement to consolidation, $100 of state money is furnished yearly to a two-room school and $200 to a three-room school.

There is another important fact to which I wish to call your attention, and that is the fact that today country school pupils are mere children. In one case in Wisconsin out of eighteen schools visited, we found that practically all of the pupils were only twelve years old or younger. Only two, I think, in these eighteen schools were over that age. Why is this? Are the older pupils in the high schools of the towns and cities? No, they are not. Our statistics show that only 3 or 4 per cent of the total enrollment of the country schools are non-resident pupils in the city schools. We have to face the fact that most country pupils stop their school attendance at twelve years old, but in the towns and cities they go on to much further than this.

One of the important things in connection with this whole subject is that of arousing public opinion so that farmers may realize that their children are being sent out with inadequate equipment. I confess that as educators we have not heretofore reached the farmers with educational questions. We are trying to do this in Wisconsin. We are trying to make farmers see that education pays. We even talk education on the dollar and cent basis, and we are having no difficulty in arousing the interest of farmers, many of whom drive for miles to listen to discussions on educational topics.

You are doubtless aware that there is a demand in many states for the teaching of the elements of agriculture in the rural schools. I agree with the advocates of this plan in their criticism of present school work. I am free to admit that much of our public school work both in the primary schools and in the high schools is not of sufficient practical value, or of sufficient training value. I like to divide people into about four classes; people who think and never do anything; people who never think about what they are doing; people who never think or never do anything;

and people who both think and do. We need this last class, and I sympathize with those who seem to think that we need more school work that teaches pupils to do as well as to think. But anyone who has looked over the attempts to introduce agriculture into primary school work, must be compelled to admit that all these efforts so far have been failures. I think there are two reasons for this. First, the material for study is beyond the pupil's capacity in the lower grades; and second, teachers themselves have not sufficiently digested the materials of study, and are not qualified to properly teach agriculture.

But there are some things along this line that may be done. We are going to try an experiment in Wisconsin this year. In connection with our Arbor Day program we shall send out a lesson on the proper treatment for oat smut. We shall ask every teacher in Wisconsin to learn this lesson, and to teach it to every pupil in the schools. Now this disease of oat smut it has been estimated costs Wisconsin farmers $6,000,000 a year, and if we can succeed in reaching the children, and through the children reaching the parents in this practical money-saving way, it is possible we can demonstrate that something can be done along the line of teaching agriculture in the rural schools.

But we must have an education for the country boys and girls by the district schools, and we must have it of the right kind, for if the boys and girls from rural schools do go to the high schools, they do not get what they need. What I would like to see is a school that shall take boys and girls from the country schools and give them about two years work, not in ordinary school work, but in things more practical. I should want to see the boys taught the elements of agriculture, taught about soils and their properties, and how they should be managed, taught about plants,—not the ordinary botany of the text book, not science, but practical farm botany, how crops grow, how to meet crop diseases. I should want boys taught how to feed stock, how to breed stock, how to care for stock in health and disease.

Now we have talked this thing up in Wisconsin, and last winter the legislature passed a law creating two schools of this character. The state gives one-half the expense for the school; the county the other half. These two schools are to be opened this fall, and we are now working on the course of study. Several other counties are eager for just such schools, and they will come in time. I want to say further about these schools, that while the kind of training found in them is intended to be of practical use, it is a kind of training that is good for anybody's children. We shall have simple farm accounts taught, manual training, so that the boys may learn to use properly farm tools and farm machinery. For the girls we shall have courses in home making and domestic economy. We now leave out of the schools those things that girls will use most; indeed we leave out those things that they will use nearly every moment of their lives. I am aware of the ravages of intemperance, and I should like to see the day when it can be done away with, but I agree with the man who said that more people are ruined by indigestion than by strong drink. I attend farmers' institutes in Wisconsin, and I hear men talking intelligently about balanced rations for their cows, and I notice farmers are deeply interested in these discussions. But isn't it strange that they are so little interested in balanced rations for themselves and children? Now the girls in these schools will learn just these things. We know

that good nursing has more to do with the recovery from disease than medicine. We shall have our girls learn invalid cooking and things of that sort. All of these things have been tried abroad and with the greatest success and I think they will succeed with us.

Another point about these county agricultural schools. They will become a sort of center for the farmers of the county. The superintendent of such schools must be a man competent to speak with authority about agricultural matters. There will be experimental plots of ground. The children will not only learn practical things, but they will take home to parents advanced methods.

So to sum up the thoughts I leave with you for the improvement of our rural education: First, consolidation of schools; second, transportation of pupils; third, the county training school for teachers; fourth, the county agricultural school. I do not claim that these movements will solve the problem, but I do claim they are helpful, and that they can be done, for they are being done.

THE RURAL SCHOOL PROBLEM IN MICHIGAN.

HON. DELOS FALL, SUPERINTENDENT OF PUBLIC INSTRUCTION, LANSING.

Mr. Chairman, Ladies and Gentlemen:—

I am very glad to be present at this meeting tonight to give welcome and, if I can in any way, to assist in the very excellent work which has been done by my distinguished brother superintendent from across the lake. He has so thoroughly covered the question of the rural schools, and so completely to my satisfaction, that I would be glad if we could dismiss the meeting just at this point and go away from it, thinking seriously and earnestly upon the questions growing out of the suggestions which he has made to us; and I'll only spend a few minutes in trying to emphasize some of the points which he has made.

I want, however, to speak of another source of pleasure at being present tonight at this round-up farmers' institute, and I only wish that the members of the Michigan Political Science Association could have seen, as I have, in a dozen or fifteen counties of the State, the large assemblages and the enthusiastic discussions of the questions which come close to their homes. I do not think it can be equalled anywhere on the face of the earth,—the enthusiasm, the intelligence, the earnestness with which the farmers of Michigan have been applying themselves to the discussion of the economic questions which surround them in their everyday life. It is money well expended. The State is carrying on a great work of education in its liberality, in the support which it gives to these farmers' institutes, and I am glad, also, to record that when this subject of the rural schools is on the program the audiences did not seem to diminish. On the other hand, I think I observed that the audiences increased rather than diminished when the rural school question was to be discussed.

I wish to make reference to one address in particular. That was on the topic, "The Best Product of the Farm." Now, the best product of the

farm from my Brother Oviatt's standpoint was not a larger bin, not a more capacious barn, not larger flocks, not an enlargement of his bank account, but with an emphasis which I cannot myself find words to put on the subject he told the farmers that from his standpoint the greatest thing on the farm, the greatest product of the farm, is the farm boy and girl. I want to repeat it, as I have been doing in the institutes, the greatest thing in the world is the twentieth century boy, the twentieth century girl. Yet I am not, I must confess, so anxious about the girl as I am about the boy, for the reason that the girl has demonstrated over and over again her interest in education. Study the graduating lists from our high schools and you will notice that the great majority of them will be girls, about in the ratio of 16 to 1. Excuse me for bringing any politics into this, I did not mean to do that.

What shall we do with the boy? My first answer is that we ought to give him a liberal education. Now, we may differ in our estimate as to what a liberal education is. Some will contend that a liberal education consists in the teaching of the three Rs, and they will insist, as Supt. Harvey suggested, that the little red schoolhouse with its teaching of the three Rs has produced if not all the great men then a large proportion of them. Others will insist that every boy and girl will find all that is necessary in what is taught in the first eight grades. Lately I have seen an article in one of our important papers to the effect that the high school should be done away with. I believe that does not reflect the sentiment of any large number of the more intelligent citizens of our State. The high school has had to fight its way into our system of education, the people being apparently willing always, from the early times, to supply primary education, and always ready to make provision for higher education; but if you study the history of education you will find that the high school has been obliged at all times to demonstrate its right to exist. It has made its way and proven its right to exist in the cities, but one link is still wanting and that is the establishment of a secondary school, the high school in the country, so that its advantages will apply to every boy and girl in Michigan. I want it to be remembered concerning the two years of my administration that I have insisted over and over again that every boy and girl in Michigan should have a good high school education. I think that is the least we can give to our boys and girls.

Just as it has been argued here tonight, times have changed, the demands upon men and women in the generation of which the boys and girls will form a part will be greater than those that have come upon you and me. If these boys and girls are not to be handicapped in the race for life, if they are not to fall back and be marked down as failures in the business, social and political world, they must have the benefits of a high school education.

I come to discuss this high school education. I believe that is the sentiment of the State, that the people of the State believe that every boy and girl should have a high school education, and I take two or three simple illustrations to prove that this is true. In the first place 17,000 and over of our farmers' boys and girls were sent out last year from their country homes to city schools. There is a figure which is a demonstration in itself, proving that the farmers do appreciate the benefits of a high school education. That is, to be sure, only about 5½ per cent of

those who are in attendance upon our graded schools, but after all if one-sixth of the pupils from the rural schools attend the high school it is in itself a demonstration of the appreciation which the people in the country have for a high school education.

Last year $88,000 was paid for non-resident tuition. Not a small monument that to the appreciation which the country people have for a high school education. But this is only a small part of the expense to which these people were put for the high school education of their children. Put alongside of the non-resident tuition the estimated expense of transportation, extra clothing and all the necessary extra expenses which a high school pupil needs to pay. I have asked many farmers what was the ordinary expense of sending a boy to a high school for a year. I have never had a response less than $100. I wish to make it perfectly safe. Let us say that it costs $50 to sustain a boy in a high school for a year. Seventeen thousand of these left their country homes and went to the city. It therefore amounts to the pretty sum of $850,000 and this added to the $88,000, and, forcing the figures up just a little, the fact is reached that the farmers of Michigan, in order to show their appreciation of a high school education, after paying their taxes at home, like good, loyal citizens, put their hands into their pockets for love of their children, and paid a round million of dollars. This sum represents to my mind so large a sentiment, it is so significant of the appreciation which they feel for the high school, that I believe I am justified in exhorting, urging, pleading with them, for the establishment of the rural high school.

After I had mentioned these facts, or made these suggestions, at a large meeting at the Hillsdale County Fair, a lady came on to the platform to discuss the question. One of the things she said was this: "We can send our boys and girls to the high school. We like to do that. We do not want Mr. Fall to come down here and sympathize with us. We're glad to do it." The audience cheered. When they gave me an opportunity to take my part in the discussion I asked, "after you have out of your abundance complacently paid your child's expenses in the high school, is it not true that in your own district there are, for every boy and girl, now in the high school possibly half a dozen others who are just as much entitled to high school privileges, bright and ambitious, but who cannot go because their parents cannot afford to send them?" She graciously admitted that besides the boys who went to the high school there were a large number of others who would go but could not afford the means. We must think not alone of the one-sixth who are able to go but also of the five-sixths who cannot, under the present system, avail themselves of the privileges of the high school.

I want to dip into Supt. Harvey's address at another point. I agree with him perfectly on the rural schools. We must change the character of the schools. We have been trying during all the past to make the country school more like the city school. But there are some things that are attempted in the city school which fail because of bad conditions.

I am afraid that a great many of the facts that are supposed to be taught clearly in our city high schools go no farther than the printed statement in the book; that they simply make an impression on the mind which consists of words without a vivid reference of the thought in the mind of the pupil to the real thing; and I'm afraid that this is too characteristic of city schools, that in the narrow confines of the school room,

hemmed in, it may be, by large buildings on every side, the city school is stamped with an artificiality which ought not to be there but which is there in spite of the best the teacher can do. Now, transfer the teaching to the rural high school and there you will find that the teacher may very easily make reference in the line of anything that may be taught in the school. There can be taught in the school that which may have its reference to the very life the child lives out of doors. Nature-study can be taught in the rural schools as it cannot be in the city schools. The great men of our nation have been bred in the country. Why? Not, as Supt. Harvey has well said, so much with reference to the little red school house and the effect which that has produced upon the life; for, if you will study the lives of those great men you will find that in addition to the country school they added a little to the education which they got in the country school by attendance upon high school and college. They became great in the country because there they were surrounded by that which makes for greatness in every way. It's a more difficult thing to make a great man out of the artificial surroundings which are apt to be characteristic of the city schools. You cannot so well produce a great man out of a home where the house comes close to the sidewalk and which is hemmed in by other houses close by. On the other hand, turn the ambitious boy out in the country in God's free air, let him have contact with the air, the soil, the water, the forest, the animal life, and all which makes up God's nature, which is characteristic of the country, and his soul will expand, his life will enlarge, he will take on greatness if the possibility of greatness be in him. I prophesy that there will come a time when there will be established an ideal school, a school that will do more for the ordinary boy and girl than can possibly be done in the ordinary city school. And we will be so pleased with the product of the rural high school that then, instead of 17,000 pupils going from country homes to city schools, the travel will be in the opposite direction. When I presented this thought in private conversation to a man eminent in educational work, he said "I will be glad to send my boys and girls to your rural high school when it is established, certain that there they will get an education which will be free from many of the limitations incident to that which is gained in the city school."

I want us all to study the benefits that may come and will be certain to come from the establishment of a rural high school.

If time and your patience permitted I would be glad to speak more definitely of plans and methods of consolidation. Week before last I drove rapidly through eight districts in the county of Berrien in the southwestern part of this State. I visited eight district schools. In not one of those schools was there a larger attendance than thirteen. One school had six pupils, another seven, another nine, and the largest number was thirteen; the average of those schools was eight. Now, can we make a good school out of eight pupils?

If I thought there were no Berrien county people in this audience tonight I would characterize one of these schools. Here was one called the Pollywog district. Here were two great thoroughfares, two main roads included in this district. When they tried to establish the site for the district school they could not agree, and as they could not agree, the matter, under the law, went to the township board of school inspectors. Down in a hollow, in the middle of the woods, in an obscure place, they

put a little schoolhouse, a little board house that they called a schoolhouse. The educational sentiment was low in that district because the boy teacher, without very much preparation, was willing to work at low wages. Low wages, low sentiment, carelessness, indifference toward the school; the picture can be duplicated a thousand times in the State of Michigan. There is a reason and an illustration for consolidation. I leave the picture with you. It is not a pleasant one. Those people down there realize what they ought to do and I think the first consolidated school, centralized school, that we hear about in Michigan will be in the township of Bertrand.

I have been asked one question. I will answer that and then close. "Why do you not address yourself to the question which has been made in many quarters, that we improve the schools as they are and add two grades?"

The answer is an evident one. You are asking at the present time one teacher, oftentimes a seventeen-year old girl, to teach eight grades. How a teacher can begin at nine o'clock in the morning and go through eight grades and do anything like justice I cannot for a moment understand. It cannot be done in that way, but we must enlarge the district by consolidating the weak schools together, build a better school house, pay better wages, to better teachers, have a three or four room school, giving the same chance to these teachers in the country schools to do justice to the pupils as you do the teachers in the city.

I am very glad to come to your farmers' club meetings and discuss the question with you and I am sure I can find plenty of help with men who have preceded me in this office, until by intelligent thought, crystallized bye and bye into action, we shall see a great advance in this part of our educational system which is today the weakest part—our rural schools. We shall be glad to see the day ushered in when every boy and girl in Michigan will have at least the equivalent of a high school education.

WEDNESDAY MORNING.

Hon. E. P. Allen in the chair.

Mr. Allen in taking the chair said that this question of forestry has not attracted the attention of the masses until recently. Our fathers came to Michigan with their axes in their hands confronting great forests. The forests threw down the gauge of battle and man was compelled to fight. Many a pioneer went to the grave, because in the terrible work of destroying the forests he destroyed himself. Out of these forest lands were made fertile farms and almost treeless plains; but now we have begun to find that God knew more than man about the economy of nature, and that a tree is as important as a man in its place. We have found that we must build up where our fathers tore down. We must restore the climate in southern Michigan to its normal, for it is a question in southern Michigan as well as in northern Michigan. We must build for the next generation.

THE ORIGIN AND DEVELOPMENT OF FOREST WORK IN U. S.

HON. GEO. B. SUDWORTH, CHIEF, DIVISION OF FOREST INVESTIGATIONS, WASHINGTON, D. C.

Like every other art or industry which necessity has developed in this country, the development of forestry in the United States has been exceedingly rapid. Like the old world countries where systems of scientific forestry are fairly established, the coming of forestry to us has been marked by two distinct eras: the period of propagandists and their work, and the period of trained foresters and actual forest work. We have passed the one stage and are well begun with the other—forestry proper.

No one can justly deny, however, that there was need first of the pioneer promoters of a forest sentiment. A great many good things have their beginning in sentiment. Some of these people knew what forestry means, while others were pure sentimentalists. They were working for a conservative forestry which would save the forests; but the conservation was in the spirit of "woodman, spare that tree." They did not show the "woodman" why. On the other hand, the lumberman, the builders of railroads, and the farmers were slaughtering the country's forests—its wealth. They were the enemies of forestry. But the mean things that were thought and said by the sentiment forestry, and the destruction end of forestry were harmless to the principal factions. The gap between them only widened, and the lumbermen continued to cut timber.

DEVELOPMENT OF GOVERNMENT FOREST WORK.

Government forest work in the United States began in the seventies. The farmers were given some tree seeds and warned to be careful of their forests. A vast amount of statistical data was compiled and distributed under the early appropriations for forest work. But up to 1886 there was no recognized forest office. In 1887 the terms of the forest appropriation for the year established a division of forestry. The appropriation was about $8,000. This sum was slowly and reluctantly increased until in 1898 it was $28,520. In the meantime some practical work was done. The distribution of tree seeds and seedlings was discontinued. Farmers didn't know how to use them. The division of forestry did some tree planting itself where most needed in the Middle West, with the hope of teaching the farmers by object lessons, and also of finding out what trees were adapted to the soil and climate. This gave some good results, but not the most satisfactory. The main work of the division was in the line of propaganda and the dissemination of useful information on various forest subjects.

In the meantime public sentiment was being forcibly drawn to forest saving projects. The federal government began to set aside large forest areas in forest reserves and national parks. The purpose was to save the forests and protect game. The general land office was charged with the administration of these forest lands. This gave rise to a division of

forestry in the general land office. The division of forestry in the department of agriculture naturally felt hurt that Uncle Sam should have forgotten to centralize in it all government forest work. Passing over the anxiety and period in which we nearly lost our reserves, there came another division of forestry in the United States geological survey, concerned with land classification in the federal reserves, including a study of the character, distribution and available supply of commercial timbers, together with a study of the damages done by forest fires. Three divisions of forestry under different branches of the government.

Attending these movements and work came other movements. The lumbermen were being compelled to cut smaller and smaller diameter limits in order to supply the enormous demand for lumber. The virgin forests of pine, of oak and walnut were disappearing. Thoughtful lumbermen, wood consuming industries, and the sentiment of the people were turning seriously to a system of forestry which would secure a sustained yield of timber. There was moment favorable for the introduction of practical forestry. The division of forestry in the department of agriculture was prepared then to do it, but needed more funds.

The appropriation for the forest work of the agricultural department was increased from $28,520 in 1898 to $188,520 in 1901, and now the funds needed for the fiscal year 1901-1903 amount to $301,000. In July, 1901, the division of forestry became a bureau. Giving rise to this need of an increased supply of funds and increased organization in a new policy and development of practical field forest work. The lumbermen have been made to see that properly regulated lumbering is a part of forestry which is compatible with legitimate and immediate profits. The forester has convinced him that forestry is not a sentiment, but a cold business proposition. The lumberman has been shown that the forester is his helper; that lumbering is not the work of a vandal, but under easy restrictions a part of forest utilization. The change of the lumberman's attitude is a marked advance for forestry in the United States.

With the understanding also, that under conservative management the vast timber resources of the federal forest reserves are to be utilized by the people, it has been possible without serious opposition for the government to increase the total area in reserves to some 46,327,969 acres. With the nearly assured establishment of the Appalachian forest reserve of about a million and a half acres, these reserves will reach from the Atlantic to the Pacific, and include also forest planting reserves in the treeless Middle West. Forestry, both as expressed in the rapidly increased and increasing area of the federal reserves, and in the increased funds for government forest work, shows that forestry is gaining a firm foothold in this country—in fact, I may say has already gained it.

Other gratifying evidences that we are embracing forestry with a fixed purpose is the rise of forest education in the United States, and the eagerness with which commercial interests controlling extensive timber lands are seeking the advice and cooperation of the bureau of forestry.

New York established a college of forestry in 1898. Connecticut established one in 1900. A course in technical forestry is given also at the Biltmore (N. C.) Forest School. In addition, many colleges and universities are offering courses of lectures on forestry; and but for the lack of properly trained foresters, a number of institutions would gladly

establish chairs and departments of forestry. So great is the need of trained foresters that the government forest service is not able to expand as rapidly as would otherwise be possible.

The acceptance, as stated above, by owners of woodlands and timber tracts of advice and technical forest working plans from the bureau of forestry for the management of their timber supplies is exceedingly widespread. Likewise, the acceptance of similar help by tree planters throughout the states is very great. The bureau has more work of this kind than it can take care of properly. In addition, it has been commissioned, through a request of the secretary of the interior, to supply forest working plans for all of the federal reserves. The completion of this work alone will require fifteen or twenty years.

ORGANIZATION AND WORK OF THE BUREAU.

As I have just said with the enlargement of funds came the expansion of the division of forestry into a bureau of forestry. This happened only last July. At present the bureau of forestry is divided into four principal divisions: the executive office of the chief forester; the division of forest management; the division of forest investigation, and the division of office routine and records. The division of forest investigation has come all the way from Washington to get acquainted with the people in Michigan who are interested in forestry. The whole bureau expected to come, but had to remain in Washington to look out for our appropriation for next year's work.

SCOPE OF FOREST WORK.

In general, the work of the bureau includes the making and execution of working plans for federal, state and private forest lands; the study of forests, forest fires, forest grazing, commercial trees, lumbering and forest products; the study of economic tree planting and the preparation of planting plans. The bureau is cooperating with the federal government, with several states, and with many private owners in handling their forest lands. Its assistance has been asked for a total area of 52,170,036 acres, of which about 4,000,000 acres are held by lumber companies and other private owners. In its studies of commercial trees and forests, and of their forest problems, it is pursuing lines of investigation indispensable to the development and perpetuation of our national forest resources. Its work of tree planting on treeless plains already involves the making of planting plans for many thousand of acres of wood lots, shelter belts and commercial plantations.

OFFICE OF THE FORESTER.

The forester or chief executive of the bureau has general directive care of all forest work in consultation with the chiefs of divisions, and of all administrative functions of the bureau.

DIVISION OF FOREST MANAGEMENT.

Requests from private owners for practical assistance and advice in the handling of their forest lands are cared for in this division. Of the

very recent requests for assistance the most noteworthy is the joint application of the Kirby Lumber Co. and the Houston Oil Co. for help in devising the best method of managing 1,000,000 acres of long-leaf pine land in Texas. This area includes considerably more than half of the long-leaf pine lands in that state.

Personal examinations in the woods were made during the year past of 788,890 acres of private ownership, and four detailed working plans were prepared, covering an area of 226,000 acres. One of these was for the tract of a lumber company in Arkansas and another for a tract in Missouri owned by the Deering Harvesting Company. The preparation of working plans was begun upon five timber tracts of private ownership, with a total area of 628,000 acres. The largest of these consisting of 300,000 acres is in Maine, and owned by the Great Northern Paper Company. The fact that the offer of cooperation under which these working plans are made is being taken advantage of so extensively by lumber companies and other business organizations indicates clearly the real practical value of the bureau of forestry to private owners.

The preparation of working plans for the federal forest reserves goes steadily on. The working plan for the Black Hills forest reserves has been completed, and working plans have been begun for the Prescott, Bighorn and Priest River forest reserves. The immense labor involved in some of these plans is indicated by the fact that for the Black Hills plan alone the diameter of every tree, large or small, was measured on 10,234 acres, and complete ring countings were made for 4,500 trees. All these field measurements require painstaking elaboration in the office.

In cooperation with the state of New York, which appropriated $3,500 for that purpose, the field work necessary to a working plan for townships 5, 6 and 41, in Hamilton county, in the Adirondack forest preserve, has been completed. The results of similar cooperation in township 40 have already been printed (Bull. 30) in the form of a complete working plan.

DIVISION OF FOREST INVESTIGATION.

Studies of commercial trees, the practical advantages of which are becoming more and more evident, are included in the work of this division. Extensive studies of the redwood, red fir and hemlock of the Pacific coast have been completed and are ready for publication. Other trees under investigation are the western yellow pine, the loblolly and shortleaf pines, of the south, the more important southern hardwoods, the Adirondack balsam, and the second-growth hardwoods of New England. The location, size and ownership of the big tree groves in the California Sierras have been thoroughly studied for the first time, and much fresh information has been obtained of the character of the tree.

The region containing the proposed Appalachian forest reserve was examined last year in cooperation with the United States geological survey. The forest on 9,600,000 acres was mapped, the lands were classified, and a careful study was made of the forests. The purpose of this work is to point out the good which would result from its careful and conservative management. The creation of the proposed reserve is urgent, in order to protect the headwaters of important streams, to maintain an already greatly impaired supply of timber, and to provide a national recreation ground, which with the single exception of the

Adirondacks, will be readily accessible to a larger number of people than any other forest region in the United States.

A study of the Sierra forest reserve of California was undertaken two years ago also in cooperation with the United States geological survey, and is now completed.

Following the request of the Secretary of the Interior for reports on technical forest matters, the effect of grazing and of forest fires was investigated in twelve of the forest reserves. A study of the present forest condition of Nebraska, and of the causes which led up to it was begun and pushed far towards completion.

The bureau is now conducting an investigation in the south to devise conservative and practical methods for turpentine orcharding. Since the maintenance of the naval stores industry is of great necessity in the southern states, this investigation is one of the most important now being carried on by the bureau.

The importance of this investigation is very great. The purpose is to dispense with the old destructive method of tapping long-leaf pine, a method which will soon destroy these pine forests, and hence one of the greatest industries of the south. A method of tapping has been devised by which it is believed not only a superior and greater run of resin is secured, but the tapping can be indefinitely continued without permanently damaging the trees. The new product of commercial rosin is almost entirely of first-grade quality, while a higher percentage of turpentine may also be derived.

An important special investigation under way in this division is a study of the physical and chemical character of commercial woods with a view to devising a practical method of increasing the durability of timbers used in contact with soil and water. The investigation bears particularly on railway construction timber. The fullest cooperation in supplying ties and other railway timber, free transportation, and funds for the experiments is being offered by many of the largest railroad companies in the United States.

FOREST EXHIBITS.

This division has to do also with the preparation of forest exhibits. The importance of these is coming to be greatly appreciated, not only as a means of stimulating the many industries depending on forest supplies, but more especially for the broad educational value these exhibits have for the people.

DENDRO-CHEMICAL LABORATORY.

A new line of work in forest chemistry which has been recently undertaken by this division, is of the utmost practical importance to the investigations of forestry. This work is devoted to the study of forest products in regard to their composition, their relation to the soil, and the products which they can yield. When it is considered that many of the great technical chemical industries of the country are intimately dependent on forest products, the magnitude of this work is easily understood. Among these great interests the tanning industry stands, perhaps, first, followed closely by the industries devoted to the manufacture of wood

pulp and to the distillation of wood and the production of wood spirit, methyl alcohol, acetone, pyroligenous acid, charcoal and other products. This work is now thoroughly organized and will be prosecuted with great vigor.

DETAILS OF THE BUREAU'S PRACTICAL WORK.

The forest work through which the bureau is reaching and securing the support of the constituents of American forestry is that cooperation outlined in circulars 21 and 22.

Circular 21 outlines the practical assistance the bureau can give to farmers, lumbermen and others in the handling of their forest lands. This offer may effect three classes of owners: The government of the United States to which belong the reserve and unreserved forests of the public land states; some of the states, and lastly, private owners, among whom are individual men, companies and institutions.

The private forest lands exceed in area those of the states and the federal government combined, and their preservation in productive condition, as regards timber and water supply, is of vast importance to the nation. As a rule, the treatment these lands receive, destroys their value, instead of sustaining or increasing it. The reason is evident. The lands, like other private property are held by their owners for the returns of the yield, and the owners as yet have scarcely begun to understand that it was better as a rule, to protect a forest in harvesting the timber crop than to destroy it. A knowledge of how to bring about this desirable result is still more restricted, while trained men capable of advising forest owners in the matter are very few indeed.

For these reasons the bureau of forestry has undertaken to provide a series of practical examples of improved treatment of private forest lands, in which the present interest of the owner and the protection and improvement of the forest shall have equal weight. The one is essential to the other, for the productive value of forest land, is the only consideration that will lead to its preservation by the great majority of private owners. The object of the present undertaking is to show that improved ways of handling timber lands are best for the owner as well as the forest, by assisting a few owners to make trial of them, and then publishing the methods and results for the benefit of all.

Forest lands in private ownership are mainly of two kinds, small holdings, for the most part farmers' wood lots, and larger areas, chiefly valuable for lumber. This bureau is prepared to lend its aid to the owners of each kind, on receipt of applications stating the situation, area and character of the forests for which working plans are desired.

Applications will be considered in the order in which they are received, but precedence may be given to the lands most likely to furnish useful results. A working plan once prepared will not be put in effect unless it is satisfactory to the bureau of forestry and to the owner.

Throughout a very large portion of the United States every farm has a certain part of its area under wood, either planted, as in regions otherwise treeless, or of natural growth. The value of this wooded portion, besides affording protection from the wind, is chiefly for fuel, fencing and railroad ties, with some building material and the wood needed for special use about the farm. Without the wood lot the farm would

very often be an unprofitable investment, because the farmer could not afford to buy the wood which now costs him very little except the labor of cutting and moving it. Indeed, in very many cases, the wood lot keeps the farmer going. His labor there during the winter, when otherwise he would be idle, makes up for any deficit in the cultivated land, and the ready money he may receive from the sale of fuel, ties or other material, is indispensable to his comfort and prosperity.

In two directions then, material and money, the product of the wood lot is of high importance to the farmer. But in the majority of cases this part of the farm is far less useful than it might easily be made. This is true because the farmer does not study its productive capacity as he does that of his fields and pastures, and hence does not make it yield as freely as he might, with little or no additional labor, if he went about it in the right way. But the farmer has been told this before when forestry here was a propagandum. We have something better to offer now in the way of a working plan. The acceptance of this plan involves a joint agreement signed by the secretary of agriculture and the applicant.

WHAT A WORKING PLAN INVOLVES.

Ten years ago the attitude of lumbermen and other owners of forest land towards forestry was one of a more or less kindly contempt. Five years ago, the situation had so far changed that there began to appear, little by little, appreciation of the fact that practical forestry for the private owner, like lumbering, aims at the most profitable management of forest land. But there was still the crying need of practical examples of conservative forest management. It was easy enough to tell the lumberman that this system was wrong, but the American lumberman is influenced by proof rather than propaganda. The most vehement statements, that his methods are not financially the most desirable, entirely failed to convince him. For these reasons the bureau of forestry undertook to provide a series of practical examples of improved treatment of private forest lands, in which the owner and the protection and improvement of the forest should have equal weight. The bureau made an offer of cooperation with private owners in the management and handling of their forest lands. This offer is now open, not only to owners of timber tracts but to owners of wood lots of any size, from five acres up. The only distinction made is that the owners of large tracts, which may present more difficult questions, are required to share in the expense of solving them, while owners of small tracts receive assistance from the bureau without bearing any part of the cost.

A working plan, the name given to the detailed schemes for the management of forest lands, which are now being prepared by the bureau of forestry is first of all a plan for lumbering. It specifies the diameter limit to which trees shall be taken and includes estimates of the yield. It fixes the areas to be logged over, forecasts the profits to be realized, and sums up the whole situation from a business point of view. In so far, it treats of what is to be done in the forest, entirely from the standpoint of the lumberman, and is based upon the same study of local conditions that any good lumberman makes before he fells a tree. The lum-

berman's working plan, however, generally considers only the most profitable way of harvesting the merchantable timber. The forester's working plan is made with a view also to the removal of the mature timber in such a way as to hasten the production of a second crop. In spite of much which has been said to the contrary, there is no other radical difference between the two. Both wish to make the forest pay as high an interest as possible upon the capital which it represents. The lumberman is usually content to receive returns only once from the same area. The forester lumbers with a view to lumbering again. Exactly the same study of the quality and amount of merchantable timber, of the conditions for its transport, and the market open to it for sale, is necessary under lumbering and under practical forestry.

After the possibilities for practical lumbering have been investigated thoroughly, the next step in the working plan is to fix those modifications of ordinary logging methods which may be necessary in order to avoid damage to the forest, and to better the condition of those trees which are the basis of future crops of timber. One of these modifications which may be advisable under forestry is the raising or lowering of the diameter limit under which logging usually goes on. It may become necessary to lower it, in order not to impair too seriously the density of the forest and the probability of its reproduction. It may also be best to vary it upon different areas, because the silvicultural condition of a forest changes constantly and in the struggle for existence between the trees, some kinds require assistance in one locality and some in another. Another point to be considered in the working plan is the elimination of all unnecessary waste. High stumps, the failure to run the logs well into the tops, lodged trees left in the woods and any other form of slovenliness, are as foreign to good forestry as they are to good lumbering.

As a working plan contains directions for the lumbering of a forest with a view to the production of future crops of lumber, it must in order to justify these directions, state how large the future crops are likely to be in a given number of years, after the area has first been logged over, in addition to furnishing estimates of the present merchantable stand. Since upon these estimates are based largely the rules of the working plan as to the amount of lumbering to be done now, how heavy it shall be, and how soon the area is to be cut over a second time, and the handling of the forest generally, they must reach the highest degree of accuracy practicable.

The methods employed by the bureau of forestry in obtaining an estimate of the stand consist of actual measurements of the diameter of all trees, with a record of their number, quality and kind, upon a given portion of the area to be taken in hand. Strips usually one chain wide and ten chains long to the acre are run through the forest upon compass courses, and are so distributed as to run through all types and qualities of it. They are then worked up for general average and are used as factors in calculating the total amount of standing timber. In order to work up the present merchantable stand into cords or board feet, tables are employed which have been constructed from actual scale of felled trees of different kinds, and give their contents on a basis of diameter taken at four feet from the ground, the height at which the trees in the strips have been callipered. In several cases there has been opportunity

to compare the results obtained by these "valuation surveys" with the actual cut taken afterwards from the area for which they furnished an estimate. The comparison has shown for them a degree of accuracy not only quite sufficient for the purpose in hand, but which bids fair to prove the entering wedge in inducing lumbermen to abandon cruisers' estimates for a similar system of measurement.

To determine the amount of merchantable timber which the forest will produce in a given period, it is necessary to know the rate of growth of the different kinds of trees and the size and number of the immature trees now standing. The latter is taken from the valuation surveys, the former from what are called stem analyses. These consist in the determination of the age of felled trees by counting the rings. The age and diameter are taken at the end of each log; the length of the merchantable stem, the percentage of heart and sap wood are found and other measurements are made which aid in determining the rate of growth of the tree in age and in diameter, and other points in its life history. A number of these analyses are made of each kind of timber trees present in the forest. The results are worked up, averaged and thrown together into tables, of which the most important in fixing the future yield are those which show the number of years required by trees of different sizes and kinds to grow one or more inches in diameter. Knowing the present stand per acre of trees below a merchantable diameter, the forester now has a record of the rate of growth of other trees of the same size and kind and grown under the same conditions, from which to determine how long it will be before these immature trees reach marketable size; and from his volume tables he can calculate what their contents will be. From the knowledge at his command he can show the comparative advantages of cutting to different diameter limits, can determine the annual or periodic yield which the forest is actually producing, and can show just what the results will be in the production of future crops of timber, provided the young trees which will form them be preserved.

Such, briefly outlined, is the scope and the basis of a working plan; its purpose is to fix after a thorough expert examination, upon the best business policy in the management of forest land, whether it be a timber tract containing many thousands of acres, or a wood lot containing less than one hundred; the principle is the same—the conservation of a sustained yield from a forest through conservative lumbering, or practical forestry.

A PLANTING PLAN.

In circular 22 the bureau proposes to give practical assistance to tree planters. This comprises personal assistance to farmers and others by cooperation with them in establishing plantations, wood lots, shelter belts and wind-breaks.

The bureau of forestry is prepared so far as its appropriation will permit, to render practical and personal assistance to farmers and others by cooperating with them to establish forest plantations, wood lots, shelter belts and wind-breaks.

Applications for such assistance are considered in the order of their receipt, but the bureau reserves the right to give preference to those

likely to furnish the most useful object lessons. After an application has been made and accepted, an expert in tree planting visits the land of the applicant, and after adequate study on the ground makes a planting plan suited to its particular condition. The purpose of this plan is to give help in the selection of trees, information in regard to planting, and instruction in handling forest trees after they are planted.

The bureau does not furnish trees or seeds to planters or assume any of the expenses of planting, except to defray the expenses of its agent in making the preliminary examination and the planting plan.

The bureau gives such aid to tree planters that wood lots, shelter belts, wind-breaks and other forest plantations may be so well established and cared for as to attain the greatest usefulness and most permanent value to their owners.

WHAT IT TEACHES.

A study of forest plantations established in the past and without a full knowledge of silviculture shows forcibly the value of careful selection and association of species and of judgment in planting. Some are upon one kind of soil, some upon another; some are planted with trees close together, others with trees long distances apart; some have been pastured, others have not; some have been carefully cultivated; others have been allowed to grow to grass and weeds. As a result, some of these plantations are dead or dying, while others are in a thrifty condition. Accurate conclusions drawn from the work of the past, a knowledge of the causes of failures, and a correct accounting for the successful plantings should materially lessen future failures. The application of such knowledge must necessarily give a new impulse to tree planting.

THE VALUE OF FOREST PLANTATIONS TO FARMERS.

Few comprehend the direct and indirect value of forest plantations to farmers. In the humid portions of America, where nearly every farm has its wood lot, the total area of the woodland is more than 200,000,000 acres. It is not possible to make an accurate statement of the value of the annual products of these lands, but when it is considered that nearly all the fuel used by the farmers of the region mentioned, together with most of the wood for fencing and a considerable portion of the timber for building purposes, are annually cut from the wood lots, their value begins to be appreciated.

A farmer near Lincoln, Nebraska, set an acre of land to willow and has for several years provided all the fuel used on the farm. Today there is more standing timber on it than ever before.

Forest plantations also have great indirect value in conserving the moisture and tempering the wind. They modify the local climate to a very marked degree, while the value of groves, wood lots, wind-breaks and shelter belts, in the protection which they afford crops, orchards, stock and farm buildings, is of first importance.

Another important indirect service is the increased market value of a well-wooded farm over one without timber. Conservative estimates indicate that the farms of eastern Kansas and Nebraska that have forest

plantations in the form of wood lots, shelter belts and wind-breaks are worth considerably more per acre than those without them. There is another value.

AN INCIDENTAL VALUE OF FOREST PLANTATIONS.

To the majority of people nothing is so attractive about a home as trees. A well planted wood lot, in two or three years after its establishment, will provide the farmer with trees to plant along roads and for ornamental and other purposes.

COMMERCIAL PLANTATIONS.

A small number of plantations have been developed for profit. Most of these are located in the Middle West, and consist principally of hardy catalpa, locust, black walnut, green ash and red cedar, the purpose being the production of timber for use as posts and telegraph poles.

A ten-year-old block in the hardy catalpa plantation of Mr. L. W. Yaggy, near Hutchinson, Kansas, showed a net value of $197.55 per acre. The trees were grown for posts and telegraph poles and had reached an average height of 25 feet and an average diameter of 3¾ inches. A 25-year-old plantation of red cedar near Menlo, Iowa, showed trees averaging 15 feet high, 5⅓ inches in diameter, and had a net value of slightly more than $200 per acre. A number of other plantations can be pointed out that give returns exceeding those to be obtained from agricultural crops on the same land. Such returns are leading many persons to establish forest plantations purely as a matter of investment.

FOREST EDUCATION.

In closing this part of my talk I want to say a few words about what the bureau of forestry is doing in an educational way. And, by the way, just as some of the brainiest statesmen have come from the farm, so there is need in the profession of forestry of young men with the healthy virtues and strength which the farm home can give. To such young men as have the natural fitness for forest work, and are willing to properly equip themselves for the profession, forestry in the government service and in that of private corporations and other operators of extensive forest properties, there is practically a new profession offered. In respect and importance it is one, moreover, which is second to none of the higher professions of the day. The demand for foresters trained to deal with American forest conditions is far greater than the supply.

There are but three forest schools in the United States where a young man may be fitted for the profession. In view of the fact, however, that it is most difficult to discover one's fitness for such a life work, the opportunities offered to young men by the bureau of forestry for answering this question are of unusual importance. I refer to the position of student assistant which the bureau offers. It has been created to afford young men who are thinking seriously of making forestry a profession an opportunity of becoming sufficiently familiar with some lines of forest

work to decide whether or not the profession is a fitting one. One or two seasons of field and office work usually suffices to decide this point. Then, as a rule, if still seriously inclined, the person is advised to take up a regular course of training in a forest school. The position of student assistant is in no way a stepping-stone to the higher positions in the profession, but forms a part only of the training useful in fitting one for the higher work.

The salary paid is very nominal—$25 per month for field work, and $40 per month for office work. The fitness of the applicant for appointment depends on two conditions; that he is thinking seriously of taking up forestry as a profession and that in age, physical condition and general training he is well equipped for the duties of student assistant and to profit by his work. Other things being equal, the preference of appointment is given to men with college or other academic training. Otherwise, applications for this position are considered in the order in which they are received.

THE FUTURE IN FORESTRY.

The immediate future in forest work gives unexampled opportunities. As we look forward to the work, the chance for progress stands out as it never stood out in this country before. The opportunity is broadening in a way that seemed impossible a few years ago. The openings in the different lines of forest work are far wider than we can use.

People are asking now, all over the country, what ought to be done in forest work. The time of the vague feeling that something ought to be done has gone by, and the specific demand for a specific thing is here; and it is our business to answer it. This is the great fact in the situation. As a people, we are ready for forestry.

There are two or three special things which we are all striving for, and that must be brought about in the near future if our opportunity is to be used to the full. One of them is the unification of the forest work of the government. We are all glad that the prospect for heartier cooperation between the three organizations that are occupied in forest work is better than it ever has been before; that such cooperation has just now actually begun in a new way; and that the prospect for the immediate future is that we shall all unite with new strength and new effectiveness at the old task.

For the sake of those who may not be perfectly familiar with the unification of government forest work referred to here, I will say that this unification contemplates the consolidation in the agricultural department bureau of forestry, both the division of forestry in the general land office which administers the national forest reserve, and also the division of forestry in the United States geological survey, an office engaged chiefly in the classifying of forest lands in the same reserves.

Another of the essentials for the future is the extension of the forest-reserve system. That may be said to be the first great need of forest work in this country at present. We are coming to it with an understanding and with facts that we have never had before. Wherever there are alienated lands, we can locate forest reserve with absolute knowledge of how much lieu land selection will be entailed. Of course, you know

that there is a law which provides that any man who owns land inside a forest reserve may exchange it, unless it is a mineral claim, for land outside—a perfectly just provision as applied to settlers, but one which has been thoroughly abused by some others. This law has recently become the great obstacle to the creation of new forest reserves. A knowledge of how many land selections will follow the creation of any reserve will immensely facilitate this most important movement.

There is but little time left in which state and national governments can get control of new reserves, and it must be done now or with enormous difficulty hereafter or not at all. The whole matter is admirably illustrated by the story of the New York state forest reserve. Years ago before the Adirondack wilderness was worth anything to sell, far-sighted men tried to secure its reservation for the state. They were laughed at. The result of it is that New York (which has a reserve of, roughly, a million and a quarter acres) has had to pay about $3.50 per acre for the more recently acquired parts of it, and must probably pay more hereafter.

Following the creation of reserves is the necessity of a much more intimate knowledge than we have yet of the reserves themselves and of the character of their forests. The United States geological survey is mapping the forest, the burned areas, the agricultural lands, etc. This is an admirable first step in that direction, admirably well done, but a much more intimate study must be made of the forest conditions on all the reserves before any one will be in position to handle the forests in the best manner.

One of the largest projects just ahead is the creation of the Appalachian forest reserve in the southern states. The states in interest have, without exception, signified their willingness to yield the necessary jurisdiction to the United States. There has been awakened a very powerful interest in the whole subject practically throughout the south, and, with the enthusiastic backing of the Secretary of Agriculture, the opportunity is an admirable one. This is one of the very important movements in forest work.

With this, and of equally vital importance to the region concerned, is the proposed establishment of three forest tree planting reserves in Nebraska. If secured, we are hoping that many others may follow for other treeless western states.

Another phase of forestry which is rapidly growing is the movement for state forest reserves. Michigan has a small forest reserve, and we are all anxious to increase it, and to handle it properly. The size is too humiliating to mention here in comparison with Pennsylvania which has about 400,000 acres already reserved. As a beginning Maryland is studying her forests in cooperation with the bureau of forestry. New York has been doing so for some time. One of the important movements in New York of the near future will be to repeal that clause of the state constitution which forbids the cutting of timber, and therefore, forbids practical forestry on the state lands. The framing of this law is the remnant of forest sentimentalism to which I referred some time ago. Vermont has been having a preliminary study of its forests made this summer, also in cooperation with the bureau of forestry. California is thinking of appointing a state forester, and is anxious for a state forest

school as a part of the state university. Connecticut has appointed a state forester, and has made a small appropriation to purchase a forest reserve, and all along the line this movement is pointing up. It will certainly be important. Interest in the state forest work is growing.

I want to speak briefly of a few other opportunities, only less vast, before referring to some of the specific pieces of work that are pending. In the first place, there is an enormous field opening before the forester who comes in contact with the railroads. The railroads use some 120,000,000 new ties a year, if my statistics are correct. They use enormous quantities of timber besides for construction in various ways. They own immense areas of land, either in land grant in the west or areas they have acquired in the south and east, and their influence on the side of forestry is going to mean more than almost any other single factor. The bureau has just undertaken a working plan for the Baltimore & Ohio railroad for 125,000 acres in West Virginia, which we believe means the beginning of intimate contact with the great railroads of the country just as fast as we have men to do the work and money to pay for it. That is one of the great opportunities, and it is only one of a dozen which there are not yet men and money enough to handle.

The chemical uses of wood is another great field just opening up.

There is urgent need of forestry in the Phillipines and in Porto Rico. But in the Phillipines with their 40,000,000 acres of forest, there is a field for forest work which will develop one of the best and most useful systems.

Interest in forestry is springing up all over the south. In addition to the Texas work referred to 50,000 acres of long-leaf pine is to be taken up in South Carolina, 16,000 acres of hardwoods near Grandfather Mountain, in North Carolina; 62,000 acres of pine in Georgia, 60,000 acres in eastern Tennessee, and a good deal of land, in addition, in the Appalachian range. It is fair to say that the southern end of the country, which for a long time has been slow in taking up conservative forestry, is now alive to such interests. The bureau's work in the northeast, in Maine especially, is likely to lead to the adoption of forest methods on a large scale, both by the Great Northern Paper Company spoken of and by many other similar organizations. The work in New York has been referred to.

Other work before the bureau is the preparation of forest working plans for the national forest reserves. I have mentioned this before.

In forest investigation the field is so large that it is difficult to talk about it briefly. We know so little of our forests, we have actual statistics of so few of the commercial trees, that it is practically possible to do an almost unlimited amount of work in any particular section of the country.

Among the new subjects, the question of second growth needs investigation. We know something now about certain kinds of second growth—about the time it takes to grow a second crop, and so on—but not enough attention has been given to the subject.

Enough attention has not been given to small wood lots. The bureau has often been forced to consider large holdings by their very extent. Now we want to do more work for the individual farmer. This means the preparation of working plans for a few as examples and the wide publication of the results.

Finally I want to say something about general tree planting. We have become keenly interested in that side of the bureau's activity and are looking forward to results of very great importance, especially from last summer's study of the possibilities of unoccupied lands of Nebraska. Unquestionably great stretches of the arid Middle West are capable of producing and sustaining a tree growth after the first restorative step has been taken by man. Forest plantations a little farther east have after a time assumed the characters of a natural forest, have reproduced themselves, made a forest floor, brought a forest fauna and flora together, and have begun to spread. That means that, once started, these forests are capable of sustaining themselves indefinitely. We all want to see this thing tested on a large scale still farther west. There are immense tracts out there, which under forest, are capable of producing much more than they can in any other way, and I believe our investigations in that direction are going to be exceedingly useful.

The tree planting work in the east, also, and in connection with the railroads, is going to demand more and more attention. Much of the field is largely unexplored as yet, but the work must go ahead.

This, with some other allusions, is a hasty and imperfect glance at the forest work ahead. It is enough, however, to give a sense of the great opportunities and an enormous task. Only a few years ago, it often seemed as if we were going to lose both the reserves we had and a chance to make new ones. Now the outlook is attractive. The lesson of this great outlook seems to be that we must all work together, whatever our affiliations may be.

Those of us who are engaged in forest work must see that the general progress of forestry is the aim; that the progress of forestry as a unit includes the prosperity of particular organizations.

MICHIGAN PROBLEMS.

This brings us again to the point of very great interest, the cooperation of the federal government with state organizations in forest work, and here I want to say something about Michigan.

The chief problems of the forestry situation in Michigan are:

1. Favorable legislation at the next session of the State legislature.
2. Collection of data to form the basis for a census of the forest resources of the State and the economic conditions of its forest lands.
3. Practical experiments in conservative lumbering, in fire protection, natural reproduction, tree planting, etc.
4. Reforestation of the vast area of pine stump land belonging to the State.
5. Investigations of a scientific character to throw light upon the present condition of stump land and its future.
6. Study of the tax and trespass problems.

1. Directly dependent upon favorable action by the next legislature, which shall extend the powers and resources of the forest commissioners, is the opportunity (1) for gathering necessary data with regard to the forest resources of the State, (2) for practical experiments along various lines of forest work, (3) for scientific investigation and (4) for cooperation with the federal government and State institutions.

This problem is deservedly most prominent in the minds of all who are interested in the early success of the State Forestry. It is the sine qua non.

Effort has most wisely been directed toward an educational campaign intended to popularize forest work and create a popular demand for favorable legislation. Entirely in line with this policy is the attempt to interest men, within and without the State, whose experience renders them desirable advisors.

The bill introduced before the last legislature provided for the acquisition by the forest commission of most of the delinquent tax land of the State, the poor land more suited for forests than for agriculture. This bill was remarkably careful and excellent, and was approved by some of the best authorities of the country. None the less, it stirred up great opposition. This opposition was misinformed, but powerful, and the bill failed to pass. The commission came off with an absurdly inadequate appropriation and 60,000 acres of State forest reserve. There are some who think that this verdict was final, and that the forest interests should avoid encountering similar opposition again, but should be content with endeavoring to secure a fair appropriation and first make a showing on the present reserve. I am against trying to make a showing first. Under conditions such as yours it takes a long time to show results. Now is the time to acquire land when there is so much of it from which compact forest reserves may be formed.

2. There are no statistics of the forest resources of the State. There is no organization for or means of collecting the data. In a general way it is understood that the present production of lumber (chiefly hardwood) in the lower peninsula has perhaps twenty more years to run. The resources of the upper peninsula are less understood.

There are no data regarding the economic condition of the lumbered lands of the State. On the contrary, there is much misunderstanding and misapprehension of their true condition and value, leading to unnecessary mistakes and great hardships. Abundant evidence of the practical results of lack of knowledge with regard to these economic conditions may be seen in the great number of abandoned farms, the shifting population of the jack pine plains and in the abuses of the homestead law.

Much private information of great value exists in the possession of lumber companies, land lookers, supervisors' records, etc., which a systematic canvass would make available. Examples of cooperation by the bureau of forestry with several states for the collection of such data are Maryland, Vermont and New York.

3. The cooperation and assistance of the bureau has been oftenest sought by private owners who have been desirous of lumbering conservatively. While the rapid disappearance of the pineries has limited the need for examples of the conservative lumbering of pine, at least in the lower peninsula, the rise of pine values and the margin of profit to be obtained from lumbering pine have made conservative lumbering of pine more profitable and attractive. The need and opportunity for examples of the conservative lumbering of hardwood is much more general, the results to be obtained scarcely less attractive financially.

In this connection it needs to be understood that forestry does not

attempt to revolutionize present methods of lumbering but rather to modify them.

Cooperating with the forest commission, the bureau of forestry this summer made a study of the conditions on the State forest reserve. Upon this study it will base recommendations for the management of the reserve. The most difficult and essential task was to devise a practical system of fire protection. It is believed that with an efficient fire service such protection is feasible. With this protection the conditions for natural reproduction are promising.

Experimental tree planting is warranted only in combination with successful fire protection and natural reproduction.

4. Undoubtedly the largest single problem before the commission is the reforestation of the pine stump lands. These lands include the very poorest lands of the State. Within the general area is much that is suitable for agriculture but the bulk is properly forest land, and as such it is a better investment for the State. It is preempted to some small extent, but it is impossible that it should be settled up for many years if ever.

The only serious obstacle to the natural reforestation of stump land is fire. The fire problem is exceedingly difficult. A successful and economical state policy of fire protection is the most difficult and important side of the whole forestry problem. Our agents were strongly impressed with the feasibility of economical fire protection under a right organization of the commissioner's own agents for conditions as they found them on the State forest reserve in Roscommon and Crawford counties. Satisfactory fire protection under any organization of local town officers seems exceedingly doubtful. The need of fire protection is pressing, for every year conditions are less and less favorable for natural reproduction, the necessity of planting greater and greater. Older lumbering left few seed trees; recent lumbering has often left none at all. The few seed trees are disappearing before wind, fire and theft.

5. Of no less importance are scientific investigations upon the condition of logged lands. They are urgently required for the light they will throw upon the proper management and the future of these lands. Soil and botanical surveys would furnish reliable data as to what could and could not be attempted with the improvement of natural growths. Thus a detailed study of certain representative areas of waste land in Roscommon county was made this summer with a view of determining the character of reproduction and sequence of species following destructive lumbering and fire, the value of worthless species as nurses aiding the encroachment of commercial tree species.

6. Taxation of stumpage has done immense harm in the past and is still doing great harm. The right solution lies probably in the abolishment of all taxes except the cutting tax.

Trespass has probably been the cause of more loss to the State than all other causes mentioned. At present it is better policy not to stir up opposition by the too rigid enforcement of the trespass laws.

THE FORESTRY PROBLEMS OF MICHIGAN.

Hon. E. A. Wildey, Land Commissioner, Lansing:

I have been thoroughly convinced the past year of the advantages that will come to us, and more especially to our successors, from the establishment of a forest reserve. Michigan has wonderful possibilities; it seems to me greater than those of any other state. It has been said that Michigan has made more millionaires by her natural resources than has any other state. Yet we have in Michigan confronting us a condition and not a theory. We still have the remarkable fact of an immense use of forest products of the United States, a use which in size constantly astonishes me. I understand that the Michigan Central Railroad alone uses annually one million ties, and strips yearly for this purpose 4,000 acres of land. Michigan sends telephone poles to Egypt, railroad ties to Mexico. But here is the sad fact. No one is planting to replace all this destruction. We sow our land to wheat every year; but we are not planting trees to take the place of the crop that has been harvested. Grand Rapids manufacturers of furniture are reaching into other states for their raw material. The Pere Marquette Railway goes south now for her ties. We go to Canada for our lumber. In an early day Michigan had one-half the cork pine of the country within her borders. The lumbermen took most of it, although forest fires have taken more than we commonly suppose.

Now the question that everybody immediately asks when we talk about forestry is, will it pay? I have become convinced that there is no other product of the soil that will so well repay for the labor put upon it as the forests. I know myself of large revenues coming from very small plantings of trees. I know a case of 35 white pine trees on about one-third of an acre, which in 35 years brought $50, or $1.50 per acre. This is an indication that if a thorough forestry system had been established in Michigan 35 years ago in the white pine forests, we might today be cutting in Michigan immense quantities of the best white pine lumber, and still have with us the virgin forests with no prospect of their diminution.

In 1899 the legislature of Michigan created a forestry commission of three members, one of whom is Commissioner of the Land Office. I am proud to say that the president of that commission is an expert in forestry. Since 1885 he has given constant attention to this subject, and I consider Hon. Chas. W. Garfield as the best equipped man in the State for this important position. Last winter this commission set aside a reserve. We went all over the State and selected a locality for this reserve which, in our judgment, is the best fitted for this purpose. It lies in the counties of Roscommon and Crawford. It contains within its borders two of the largest inland lakes in Michigan. These lakes have an area of 108 square miles. It is 700 to 800 feet above the great lakes, and 1,300 to 1,400 feet above the sea. All the great rivers that drain the northern half of the lower peninsula have their sources in this reserve, viz: Thunder Bay river, the Au Sable, the Tittabawassee, the Muskegon and the Manistee. It is a well known fact that such rivers as the Kalamazoo for instance

which even now have large water power, are much shallower than they were half a century ago. This is true also of these great rivers in Northern Michigan. There is much less water in them than there was years ago. We believe it is due to the fact that the forests have been taken away from their sides. One prominent idea in choosing this particular location for the reserve is that the flow in these rivers may be kept more uniform throughout the year, and thus their marvelous water power be developed. There is more water power in these rivers I have named in northern Michigan than in all the rest of the State probably. Thousands of horse power going to waste, and it will still further be diminished if the forests are entirely cut away.

Now we have not yet authority from the legislature to entirely manage this reserve. Most of these lands are what are called delinquent lands. You may be astonished to know that out of the 37,000,000 acres of land in Michigan, over 6,000,000 acres, or about 18 per cent, are held by the State for unpaid taxes—taxes which in many cases have accumulated until they amount to very much more than the lands are worth. After a certain process these lands come back to the State and the State owns them. What we want is to have the legislature put large areas of these delinquent lands into the hands of the forestry commission to be used for forestry purposes. But the legislature is not yet educated to do this as fast as it ought to be done, and we want you to educate the legislature in this matter.

There are two things to be kept in mind as I have already intimated, the protection of the trees from fire and trespass, and the securing of a growth of forest at the head waters of streams.

I want to leave another thought with you, and that is that this work will go on faster than you imagine. I have with me on the platform a section of a cottonwood tree 24 years old, grown out of a soil originally a huckleberry marsh, with sand underneath, which was burned over thoroughly about 25 years ago. When that tree was cut this year it was 81 feet high and 36 feet to the first limb, and it grew in thick timber.

The reserve we have made consists of 47,000 acres situated in twelve townships, and we want your assistance in getting legislation which shall make this a genuine State reserve for forestry purposes.

Professor C. A. Davis, University of Michigan:

I shall be very brief, but I have one or two things to say that may be of especial interest to the political economists. As Commissioner Wildey has said, we find that nearly one-sixth of the land of the State is idle and worse than idle, because it is a source of menace to other people. There is danger that in this unoccupied land the loose soil will be moved by wind and cover up valuable land near by. That is actually being done in some cases, and this question of the moving sands alone is worth consideration. Then the social side is important, for much of this land is what may be called non-agricultural. Much of it is not suited for the best farming, yet it is often picked up by speculators who advertise it to unsuspecting immigrants as first-class farm land. Now I say it is not right to tempt a poor man to such land. If you go through this forest reserve that has been mentioned, you will find much land of this kind.

You see deserted homes, dilapidated fences and forgotten graveyards. Of course, some years the land is all right when there is plenty of moisture, but in a series of years much of it cannot be farmed properly. My argument is that the State has a duty to take such land out of the market for homestead purposes. So too, these lands present a picture of a shiftless State. If we knew a farmer who let one-sixth of his farm be idle and grow up to weeds and thistles we should consider him a poor business man. Can we regard the State any differently?

The first problem is to get something to work on. We must have this reserve under control of the commission and we can then go ahead.

Hon. Charles W. Garfield, Grand Rapids:

Some years ago I remember that our friend S. L. Fuller, the horticulturist, told at a meeting of the horticultural society of what Mr. Gregory, of Pine Grove, had done in nine years. He went into one of those sections where the pine timber had been cut off and in nine years he was able to exhibit at the horticultural society a lot of fruit grown on that same land that would do credit to any region in the State. This suggests the desirability of transforming these pine slashings into something better.

The question is often asked me, how long does it take to turn tree seeds into money? I have near my house a pine tree planted in 1878, a mere shoot then eight inches long. This year, I saw saw-logs going down the Muskegon river which were smaller in size than can be made from that pine tree. I have another tree, an elm, also started in 1878 and started from the seed. Today that elm will cut two ties and two fence posts. Eleven years ago I planted locust seeds that I might have a locust tree wind-break for protection. Out of each of these trees today I can get one fence post and two sticks, good solid fence posts too.

Seven miles from Grand Rapids there is a tract of eighty acres. Fifty-eight years ago a man bought this land. It was worthless then, poor sandy land with a few scraggly trees consisting mostly of little pines about the size of my arm. This man's friends and neighbors guyed him so about having purchased such a worthless piece of land that he sold it to a friend of mine for a yoke of cattle. That was 52 years ago. One year ago I saw a check which went through a Grand Rapids bank for $8,000 which had been given in payment for the timber alone on this eighty.

Down in Connecticut a short time ago on the poorest of New England soil, I saw chestnut groves that I supposed were second growth timber, but the friend who was with me said it was probably fourth, fifth or sixth growth, that a crop of chestnut telephone poles could be cut from these groves once in 25 years.

Now I submit is it not worth while to see if there is not money in growing timber on poor lands. These examples would seem to indicate that it is worth while, and our commission is trying to set an example by having a reserve given us. We want to see how even poor land can do in growing crops of trees. The State has responsibility in this matter, for it is taxing timber holders very high up north, and they cannot afford to keep the timber. This thing must be changed. We must take care of the forests and we must have legislation that will make it an object for

men to take care of the forests. We must make this 6,000,000 acres of delinquent land productive of something.

May I not also say a word on this subject with reference to the beauty of the State. Our State motto suggests that we have the most beautiful of states, and it was so when the motto was made; but we are sweeping away all this beauty by slaughtering the trees. Now we cannot say to a man, you must plant a tree, but we have to touch his public spirit. So I have been trying to argue with some of our millionaires in Michigan, of whom it is said that 90 per cent of their wealth has been made from Michigan lumber, that they should endow pieces of land where nature can grow forests and manage them. I believe this would be worth more to Michigan than for them to found colleges and hospitals. In closing I want to ask you to stand by the forestry commission in their efforts to solve this important question.

GENERAL DISCUSSION.

Dr. Alfred C. Lane: The forestry question is broad. It is not merely a question of growing timber, but a question of keeping the sands from shifting, of the supply of city water, of the water power for rivers, etc. So far as the timber work is concerned, it must be done by corporations or by the State; individuals won't do much; we cannot expect them to plant on a large scale. On the whole it is best for the State to do it. The Agricultural College and University can assist greatly.

L. B. Rice: I want to speak a word for the Carolina poplar as being a first-class soft tree. I know a tree 15 or 16 years old which measured seven feet four inches round, four feet from the ground. The lumber is better than cottonwood. You can saw them into thin boards which are good for buggy boxes, etc. It will grow on sandy soils and if put in deep, will keep the sands from drifting.

Q. What is the cost to the State of advertising these delinquent lands which Mr. Wildey mentioned?

Mr. Wildey: It cost the State last year $66,367 to advertise these lands and $2,000 for the land within the forest reserve alone.

Hon. Arthur Hill: Being a lumberman I am always uneasy at a forestry meeting, but I will suggest the reason why the lumberman did not preserve the forest. It was simply because he did not foresee the future; he looked through the wrong end of the telescope. Had he known how things were developing and what a constant demand there would be for the smaller varieties of timber, I have no doubt he would have conserved the forests. But he did not see, and he felt that it would not pay him to hold his timber in the tree, that the only satisfactory business proposition was to cut the tree and get his money out of it, just as any of you would have done probably. Now that this sacrafice has taken place, there is only one thing to do. The State must get possession of these lands because there will be no taxes and the State can keep out trespassers and fires.

Hon. A. M. Todd: A few years ago I went searching for trees for a wind-break for a peppermint farm. I wanted one several miles long. I got 200 trees of Carolina poplar from the nurseryman. From these trees I made cuttings. Today I have two or three miles of the best wind-break I ever saw. These were set on black muck. I understand that the Carolina poplar is splendid for railroad ties, and that it makes good pulp for paper, while it grows on all soils.

Miss Mary Sherman: Some years ago a farm came into my possession on which was a twenty acre wood-lot. I have had a constant fight against tenants and hired men to cut the trees in that wood-lot. The point I wish to make is, you farmers must educate your men and boys to honor the tree on the small farm. I want you to come to the relief of the wood-lot.

Mr. Burgoyne: My observation is that in Saginaw county the rivers are very much lower than they were years ago, and I am satisfied it is due to the cutting of the forests.

Neil McCallum: Eighteen years ago I was a timber butcher; today I am a tree lover. I set a row of sugar maples eighteen years ago, and took the best of care of them, cultivated and looked after them. We have recently tapped those trees, which are one foot through. They were set for shade, of course, but they are making us returns. I want to suggest too that there are thousands of acres of this pine stump land that is sometimes thought entirely worthless that is really splendid land for fruit; at least that is so in Oceana county.

S. A. Tarpenning: One topic has been neglected. People tell us that in this forestry matter we are looking far ahead. That is not the right idea. I claim that the tree that is planted out begins in a very few years to give a return through the milk pail. I believe all authorities agree that if you have plenty of shade for farm stock, you will increase the flow of milk in the dairy herd.

Geo. A. Perry: I wish to call attention to the fact that the State encourages the planting of trees in the road by an allowance on the road tax. This may not be generally known, for I think it is seldom acted upon.

L. Sours: Most fires in Grand Traverse section are caused by the railway locomotives starting fires and thus endangering the forests. I think we ought to have a law covering this subject.

Mr. Jennings: I am glad the sugar maple has been mentioned. I know a small maple grove in southern Michigan that furnished timber for building and other farm purposes, and last year it yielded more than $200 in maple sugar.

WEDNESDAY AFTERNOON.

A. B. Cook, Pesident of the State Association of Farmers' Clubs, in the chair.

Prof. H. C. Adams read a letter of greeting to this joint meeting from the American League of Civic Improvement. Prof. Adams also explained the work of the Political Science Association, and said he would be glad if many farmers would become members.

Mr. Cook, in introducing Mr. Horton stated that perhaps the topic of the "Need and Possibilities of Farmers' Organizations" suggested that there is a need for them that is not supplied, but such a conclusion is erroneous. We have in Michigan two such organizations which are living examples of the possibilities of farm organizations. Together the granges and farmers' clubs have 600 local organization. This cooperation among farmers has reached large proportions, but there is need for still more of it.

NEEDS AND POSSIBILITIES OF ORGANIZATION AMONG FARMERS.

HON. GEO. B. HORTON.

I am asked to contribute a few thoughts for the consideration of this assembly on "Need and Possibility of Organization Among Farmers." At the outset I desire it understood that whatever is given here on the subject will be practically free from quotations from the thoughts and writings of others, and however homely I may express myself you will at least have the benefit, if any is to be derived therefrom, of originality. I am aware that you will interpret this statement as meaning a lack of reading on my part, and I will frankly acknowledge that constant activity in business and in guiding to success various matters of trust accepted by me to perform have had precedence on the time allotted to man for labor.

It may be said that it is impossible for a man in this age of books, magazines and specialty writings by scholarly people to be entirely free from their direct or indirect influence, and such statements would doubtless be true. All these are valuable contributions to the world's discussions on pending questions. People who can or do take time for much reading extra from current events and general views must in turn impart the results of such reading and study to those with whom they come in contact. But the results of this reading and study are given to others in either a concurring or may be a non-concurring way with observations of an analytic character. Thus busy men receive new theories with their possible fallacies exposed to a considerable degree. The information thus received from the crucible of public analysis tends to a division of the practical from the unreasonable, the real from the visionary.

The active business man whose time for reading outside of current events is very limited can also learn much by observation as theories are applied and the every day processes are in operation. The inquisitive brothers of Darius Green became as well informed of the real practicability of the theory which had captivated the inventor's head as Darius himself, although they were merely observers at the trial, and the view from their observatory being considerably obstructed at that. It is also true that conscientious men of affairs in important positions of trust, and who are called upon to render decisions between different theories and between the ingenious arguments of interested men will get bewildered and cannot see the way clearly to a justifiable judgment. Under such conditions they have been known to call in as counselors men who were entirely outside, and who were practically free from the influences which had resulted in bewilderment. I once had a neighbor who was noted for his liberal store of good wholesome common sense, as a result from close observation and a near contact with every day things, and who became a close friend of Governor Bagley during his administration of the affairs of our State. I knew of several occasions when this neighbor had been called to the executive office for counsel on perplexing questions. The Governor on receiving him has said, "Mickley I am glad to see you. I have important questions to decide, and it is my desire to decide them rightly and justly. I have listened to the theories and arguments of contending enthusiasts and my mind is not clear regarding decisions. I am at a point where I want the assistance of plain unprejudiced natural horse sense."

Some may question the affinity of this introduction to the question assigned me but I feel it necessary to the purpose of placing myself rightly before you, and although it might be akin to egotism to lay claims to much natural wisdom or ability to assist in harmonizing differences, I want to make it plain that what I do say will be as purely original as is possible for thoughts to be in this communicative age, entirely free from prejudice or, in other words, direct from the stump. If I am so fortunate as to be in harmony with wisdom and practical conclusions I shall feel favored. The question as it reads on the program, "Need and Possibility of Organization Among Farmers," seems to concede the need of organization but intimates a doubt as to whether farmers can successfully organize. It may be of interest in the regular order of the question to explain somewhat in detail why farmers need to organize, although such action on their part is by common conclusion in line of duty. The American farmer is naturally an up-to-date individual. Neither our ideal form of government, nor any of its policies of administration, have resulted in retiring him to a degraded or menial sphere. His ambitions and hopes are buoyant and his pride is uncrushed. He possesses a keen realization of the responsibilities of American citizenship and is willing to bear his part of those duties.

Under conditions unlike those that prevail in some parts of the old world our farmers generally own the land they till, and instead of the homes of our farmers being grouped in village form they are out in the open country near to the fields. Thus they live in a separated and isolated condition. He does not, like the city man, touch elbows morning, noon and night with a busy throng whose natural environments give opportunities

for the promotion of many benefits. Nevertheless the farmers of this country prefer to live out in the country on their farms. Our independent farm homes are the pride of the nation. Where is the man, even the city man, who does not experience feelings almost akin to envy as he passes through our open country districts by rail or by team and views the well-kept farm home with its orchard, garden and real home-like surroundings? There is such an air of independence, freedom and contentment in the picture as a whole that no one need wonder why the farm home is the birthplace of most of the successful men and women of our times. The thought of a division of our people into classes is repulsive to the man imbued with truly American ideas, but regardless of this we find it quite natural for people engaged in a like calling to be drawn together by such sympathy of interests and effort. Thus we note that where farmers live near villages and cities, and take advantage of the opportunities to mingle in a social way with town people there is never such ease and enjoyment attained as to make them feel fully at home. The social enjoyment of a single or occasional event under such circumstances may be inviting and profitable in a way, but after all the bill is not filled to satisfaction.

One may now ask, what are the needs of the American farmer, of the enjoyment of which his isolated farm life deprives him? We answer, all such benefits and helpful agencies as can be attained and established through combined effort only. Prominent among these may be mentioned:

1. A sufficiently high standing in social attainment to make and keep him the peer of the best of our people.

2. An intellectual training which shall enable him to successfully cope with all the intricate problems of his business and which will give him such knowledge of public affairs and procedure as will enable him to act intelligently on all matters which interest and concern him.

3. Such knowledge of business and the markets of the world both for selling and for buying as will give best possible returns for his labor, and to the end that more of the possibilities and enjoyment of life may be secured for himself and family.

4. Such influence upon the body politic as will relegate to disgrace all corrupting and disfranchising methods, and which will cause the principles of honesty, justice and economy to govern the acts of all public servants. Also such influence as will direct the legislation of our State and nation along lines indicated by the greatest good to the greatest number of our people.

Do you ask, is all of this goodness, intelligence and influence for farmers alone? I answer, certainly not. We would have all people working along the same lines and to the same ends, but in point of importance to the success of our State and nation, agriculture towers over all combined, and its devotees constitute over 40 per cent of our entire population. For these reasons their influence should be proportionately reflected upon our governmental affairs. If anyone fears the results proposed through this new era of a higher social standing, greater intelligence, proportionate wealth and a determining influence upon public affairs for farmer, let them note the fact that the farmers of America are naturally a patriotic and a safe people. Their general intelligence is

already on a commendable basis and as a whole they are noted for their conservatism and fairness. I believe that all will agree with me that this nation will not go far in the wrong if its policies and laws are wholly dictated by the farming population, and further it would be a safe guide for any state politician or public servant to follow, if he act in line with the expressed wishes of the farmers of our State as reflected by them through their organizations.

If all these essentials necessary to keeping farmers up to the full requirements of the progress of the day cannot be attained by the isolated farmer through individual effort (and in the light of the events of the day this point must be conceded by all), then the need of organization among farmers is established. Through organization and associated effort this scattered people must be brought together in some deliberative form. It is hardly supposable that farmers should halt to question their right to organize, for this method of promoting the welfare and interests of all lines of business, professions and of sameness of belief is accepted by all. Organization is the great promoter of the day for good or for evil in accordance with the character of the object to be attained through its potent influence.

Regarding the possibility of organization among farmers in this country it is to be remembered that the past 35 years has been an era of experiments along the line of a solution to this part of our question. As far back as 1723 an open farmers' organization known as "The Improvers in the Knowledge of Agriculture" was formed in Scotland. A similar society was formed in Ireland in 1744. The first organization of this kind in England was in 1777. These organizations were primitive in regulations and objects. They did not seek to better the condition of the man himself, and it is doubtful if at that time an organization would have been permitted which sought further objects than a better cultivation of the soil. The first farmers' society in America was "The Philadelphia Society for Promoting Agriculture," organized in 1785. From this time on during the next 20 years various agricultural societies were formed throughout New England with various degrees of success, but all of them failed after a few years of duration or were merged into other societies having broader objects in view to meet advanced conditions of the times. These early American efforts were also confined to farm matters, and not until 1866 was any effort made among farmers to organize for the promotion of not only their farming methods but their social, educational, financial and influential interests as well. At this time Mr. O. H. Kelly, owning a farm in Minnesota, and at the time employed in the department of agriculture, was commissioned by President Johnson to make a tour of the south to collect data relative to its agricultural and mineral resources. He found the country struggling to recuperate from the effects of the war. The planters and farmers were few in numbers and scattered with but limited means of carrying on their vocation. Under these conditions Mr. Kelly sought for a plan to unite for practical cooperation the agricultural societies then existing. As he matured his thoughts he asked himself why not the farmers both north and south unite and work for their mutual interests in general. Mr. Kelly's ideas were presented to others and resulted in the organization of the National Grange Patrons of Husbandry on the fourth day of December, 1867. The organization was perfected at the office of Wm.

Saunders on the agricultural grounds at Washington, D. C. Mr. Saunders was chief of the grounds and experimental work. The new organization thus formed on so broad a basis of territory as well as objects, might well have been classed with other experiments then in process at the department of agriculture. The plan contemplated the organization of local or subordinate granges throughout the states in country neighborhoods by virtue of charters issued by the national body. The growth of the grange was very slow for the first few years. From 1873 to 1876 it experienced its remarkable wild-fire sweep over the country. I can only give this mere reference in an historical way. The organization had its boom and its dark hours, but it lives today and is a most powerful answer in the affirmative as to the possibility of organization among farmers. This organization being the pioneer on so broad a basis it was obliged to go through a natural course of development, and as a result it was nearly seven years after the organization of the national body before its declaration of principles was formulated and given to the world. Previous to this its specific objects in brief were:

1. The ennoblement of labor and the fraternity of the producing classes.
2. Mutual instruction and the lightening of labor by diffusing a better knowledge of its aims.
3. Social culture, as also mental and moral development.
4. Mutual relief in sickness and adversity.
5. Prevention of cruelty to animals.
6. Bringing more nearly together the producers and consumers, the manufacturer and the user.
7. The prevention of litigation through arbitration.
8. The overthrow of the credit system.
9. Building up and fostering home industries.

These declarations were especially fitted to the times when they were promulgated. Time and experience have changed and developed the work of the order until we have it today as you all know it. Its record, its successes and its popular existence add force to the response. Yes, farmers can organize.

During these experimental years other farmers' organizations known as alliances and councils were organized. In more recent years the Farmers' National Congress has come into existence. This last is a national body made up of delegates from the states who are appointed by the respective governors. One meeting is held each year. This organization cannot lay claim to being wholly by, or for farmers. Another farmers' organization which has done much to prove that organization among the farmers is possible is the club. Farmers' clubs have been organized and successfully conducted in several states of the union for many years back. These are confined to neighborhoods principally, but in our State these local organizations are brought together annually in State association form. The club, being an open organization, is liberal in forms and membership, and gives farmers who have objections to closer rules an opportunity to place their influence in cooperation with their fellow farmers for the advancement of their mutual interest. It speaks volumes favorable to the ability of farmers to organize when we see the farmers'

clubs and the granges of Michigan working harmoniously side by side for the same general purposes. In the discussion of this question it is possible that I have not gone far enough in defining the need of farmers' organizations. There may be those who think there are questions of public policy which demand of the farmers of our country the organization of independent political parties. It seems quite evident from the records of the past and the nature of our general political structure that such movement would be unwise and its promoters would fail to realize their desires in that way. Any organization which seeks to bring the farmers together for general mutual benefit must be careful not to trespass in any way upon the religious and political rights of its members. Along these lines the work must be educational. The tendencies of such education will be in the direction of freeing farmers from party boss dictation, and the exercise of greater independence in voting as their interests may appear from the conclusions drawn from club and grange discussions. Our conclusions are that the time is near at hand when from the effect of a liberal discussion of public questions by the farmers' organizations of the State there will be created such a large politically independent force as will act as a guiding star to all party managers. It seems clear that at the present time the most important work of our farmers' organizations is to so educate as to permit this great percentage of our population to exert an intelligent and just influence upon public affairs.

It is evident that farmers' organizations have come to stay, and through their influence the agriculturists of America will maintain a social, intellectual and influential standing second to no other part of our people. If time would permit I would consider it profitable to lay before you some of the achievements of farmers' organizations, for the record is brilliant with successes. I would also lay before you some of the most urgent duties. I cannot forbear one reference. Farmers of Michigan, our district school system, which for efficiency, convenience and cost, challenges comparison with any system in operation in any locality or country in the world, is in danger. The farmers' organizations of Michigan have stood as a rock for its defense, and on two or three occasions their influence with the legislature of the State has been sufficient to prevent bills from passing which proposed centralizing processes. It seems strange that now in this progressive age when the telephone, the electric car, rural mail delivery, one-day institutes and farmers' organization are all headed our way, thus bringing these helpful agencies close to our doors, that there should be a proposition so ancient and so retrograding in character as to deprive us of our district schools and in their stead to establish some centralized plan which will compel us to tax ourselves for the hire of liveries to take our children to them. Our farmers' organizations have proposed the giving of higher school privileges to our district schools by adding another grade, thus giving our children opportunities until their fourteenth to sixteenth year. This plan demands a higher grade of teachers' certificate and better wages in proportion. This plan would increase the enrollment in district schools fully one-fourth. This demand from our people has been unheeded. I cannot discuss the matter as its importance demands. Our farmers' organizations must stand firm for their own in this matter. There is a diploma or reward of merit in existence somewhere in our State giving Michigan

the highest award of all the states and countries for the best system of common schools. This, as I remember, came from a commission sent out by the government of Australia to make inquiry of all the different systems and to adopt that which they considered best. This diploma or award should be framed in gold and allowed to hang conspicuously on the walls of the capitol of our State as an honor to the fathers who had the foresight to anticipate a system which would be in keeping with the progressive demands of future generations.

To all people here assembled, let us take pride in our great State and all of its institutions. Let us be liberal, yet just. As farmers let us take pride in our profession and business, and let us through our organizations strive to make the farmer's home the happiest, best and most attractive spot on earth.

THE CHURCH AS A CENTER OF RURAL ORGANIZATION.

GRAHAM TAYLOR, CHICAGO COMMONS.

In his "Social Evolution" Benjamin Kidd tries to show us what our body politic really is or ought to be, through the eyes of a visitant from another sphere. This inquisitive other-world stranger obtains from a man of the earth a fair idea of what the farm and factory, the town and court house are for, but his anti-ecclesiastical guide fails utterly to make him understand what part the churches have in the community, life and work, or what reason for existence they really have. Indeed, the visitor is assured that they are nothing more than barnacles on the bottom of the ship of state, the accretions from the slimier waters through which progress has been taken. Nevertheless his visitor cannot see why they exist everywhere, why the people support them and gather around them, and why they so persistently survive all the other effete and discarded things, if they have lost all usefulness, or never had any. Thus the author tries to awaken us to inquire what our social institutions are for, and especially what functions the churches have in the community, which not only their supporters, but the people at large may justly require them to fulfil.

To raise such a question emphasizes the fatal facility with which men forget the purpose of established institutions and their reason for existence, thus losing the value and even the sight of their ends in forgetting that they are means. This institutionalism which substitutes means for ends, and subverts the ends in slavishly serving the means, is the very insanity of history, political, industrial, educational and ecclesiastical. Thus the state, the municipality and the town lose their hold on life and the loyalty of the people by becoming partisan machines instead of public service utilities. Thus commercialism overreaches itself in sacrificing the many to the few, and prevents a gainful cooperation in order to promote a destructively unrestricted competition. Thus the schools and universities, by making knowledge an end instead of a means and apotheosizing culture for culture's sake, fail in their mission, which, as well defined here yesterday, is not only "to minister to industrial advance-

ment but to enable technical advancement to minister to the life of the people." Thus, too, the churches lose their souls in building themselves up out of the community instead of building the community up out of themselves, in seeming to save a man's soul at the expense of neglecting the man's self, and in resting content under the paradox of having a community of Christians which is not a Christian community.

CHURCH IN HISTORY.

When institutions thus lose or lessen their grip on themselves, it is well to follow them up stream to their fountain head and see them in the full possession of the purpose which called them into being and gave them their right to be and their room to work among men. Our New England forefathers had a community use for their churches in planting the colonies. At the center of every town they built alongside of the town hall and the school "the center church." It was intended to be, and was, the spiritual and social bond to draw and hold men to their civic centers and to send them forth thence to practise the high and holy art of living and working together. Most of their descendants not only, but many from every land who, in the brotherhood of the race, have helped build up this great international nation, followed their example and fairly took possession of this land of promise by planting the church of their fathers and clustering their farms and shops, their schools and court houses about them.

The churches were thus centered while the population was homogeneous and before the industrial organization became so complex and divisive. But when machinery and the railways created the factory towns and the great cities, and with marvelous rapidity shifted one-third of the population within city limits, then civilization experienced its most radical and revolutionary transformation. American country life suffered changes and losses from which it is only now beginning to recuperate compensatory gains. Country towns lost many of the most enterprising and valuable elements of their population. Not a few of them lost their territorial and social centers of gravity, as may be seen in Rollin Lynde Hartt's three graphic articles on "The Regeneration of Rural New England." (The Outlook for March 3, 10, 17, 1900.) See also "The Problems of Evangelization of Vermont." (Supplements to the minutes of the ninety-first annual meeting of the general convention of the Congregational churches and ministers of Vermont, 1886.)

Often the institution to suffer first and most and to recuperate last under these changes, is the county church. Weakened within by the emigration of its families or young people, cut off from the incoming population by the diversity of languages and antecedents, and hopelessly handicapped in the struggle to possess its field by the multiplicity of sects, with their feeble, non-co-operative churches, desperately contending with each other for a foothold, the church in many country places stands one side of the current of human life like a stranded ship with the big tide ebbing away. Country life has lost its hold upon people not only because of its lesser economic opportunity, but quite as much because of its lack of social interest and equipment, and the consequent heart-hunger of both young and old.

Country people swarm to the larger social centers often leaving comparative independence for the most hopelessly subordinate occupation in the city. When asked why he did not return to his good home on the farm, a Chicago youth replied, "Because I find more fun in South Halsted street in a week than I would have in two years in the country." When chided for returning to her desolate tenement house quarters in New York after having been removed to the country at considerable cost to her friends, the mother of a family of children justified herself by the declaration, "A body can't live among stumps, but must be with folks." In urging the people in western agricultural states not to overcrowd the cities, I have been indignantly answered at summer assemblies by men and women, who insisted that their families had as much right as mine to the social and educational privileges of the city.

THE TIDE IS TURNING.

Happily, however, the tide begins to turn countryward again. The social importance of improved highways and the introduction of telephones, trolley lines, and rural mail delivery is primary to and fully as far-reaching as the economic facilities thus afforded. These are socializers of the country community in a higher sense than they are wealth producers. They lift more burdens from life, than they carry for labor. They will give more heart's-ease and contentment than money value, rated by cost or production. Not the least significant among many other signs, this joint conference of the educators and the farmers of Michigan betokens an awakening consciousness of the necessity and opportunity to socialize rural life. All together they forecast the reintegration of the country community, and possibly the check of the unhealthfully rapid growth of city population.

What part the country churches are to have in the coming organization of rural life depends upon the vision the local church has of its social function. To suggest what that function may be, it has been necessary to dwell as particularly as we have upon the need which most country communities have of some inspirational and co-operative center. This need of its field must first be seen and felt by the country church before it will recognize its imperative duty and supreme opportunity to be such a center to its community.

In the organization of rural life the country church has a three-fold social function.

Its primary and perhaps supreme function is to keep the highest ideal of individual and community life flying like a flag far overhead. The church should be like the flagstaff of the community, and its membership like the color-guard. By its worship, its example, and its prophetic aspirations it should hold aloft what is worthiest for man, woman and child to be, what God Almighty meant and made community life to become in neighborhood and town.

To initiate agencies and movements for realizing these ideals practically and progressively is the second social function of the church, but its own organization is not to attempt to administer the social agencies thus initiated. For, on the one hand, neither in the form of its organization, nor in the constituency of its membership is the church adapted to be an effective executive of social movements, and on the other hand, even

if it was, it has a higher function which is all its own. If, therefore, the churches may not be the executive of social action and of organized effort for civic betterment, they may give initiative to every such endeavor by fulfilling their function of inspiring, educating and unifying the people. The social ideals of the gospel have borne their best fruits in society when the churches have supplied the town and city, the state and nation with families and citizens inspired by religious ideals of social relationship and prompted to take the initiative toward their realization. This function of the church is more formatory than reformatory. There can be no reform without the idea of the ideal form. Reformation, therefore, must ever be subsidiary to the creative function of forming the ideal. In the language of Horace Mann, "Where anything is growing, one formatory is worth a dozen reformatories." In the growing organization of rural communities let the church, therefore, fulfil its own function of forming the social relationships according to the pattern of the common life entrusted to her by God. To the church the people look for the initiative toward realizing the divine ideal of the life of the one and the many.

HAVENS OF REFUGE.

To attempt the fulfilment of their great function, the country churches may find inspiration and encouragement in the initiative which the social settlements have given toward the social organization of the densely crowded and disorganized city centers. Around the household life of those who have gone to make their home in these neighborhood houses, and to identify themselves with the whole life of these cosmopolitan districts, many communities are naturally, happily, and unitedly organizing their common interests and efforts, pleasures, sacrifices and hopes. Inspired by a higher ideal thus imparted, and started out by a new impulse thus given, self-governing, self-sustaining, organization for social, educational, recreative and political betterment, are clustering about these city neighborhood centers. In one of the country suburbs of Chicago the little church has organized, and sheltered under its roof, a "town meeting" of all the inhabitants, and has succeeded in uniting on broadly religious lines all the diverse elements of the population in a people's Sunday evening club. As the one center at which the most people continuously gather, the country church has a great responsibility and opportunity in meeting the tacit demand of its community for the highest ideal of the common life, and for the strongest initiative toward its realization. It need be none the less spiritual and churchly for thus fulfilling its social and civic prerogatives. Its good people should make the community better, and the better community would surely help make people good. Every successful effort which the country church makes toward bettering the industrial, social, recreative and educational interests of the community will be directly tributary to its spiritual purpose. The saving of souls is nothing less than the salvation of selves. For soul is not anything a man has, it is all he is or may become. The church cannot save any part of a man, nor can any man be saved entirely apart from his surroundings. To save the whole man the church must apply its whole gospel to the whole human life.

The final function of the church, most essential to all social and civic organization, is to generate that public spirit and self-sacrifice which

serve the common interests at the cost of personal ease and gain or of class and institutional aggrandizement. Without this social self-denial no patriotic, philanthropic or progressive organization of a community can succeed or survive. It is the very soul of the body politic, without which it is dead while it lives. It is the dynamic of progress without which the community is powerless to make any real advancement toward higher ideals. For the generation of this social power and for putting each citizen in possession of it the community rightfully looks to the church more than to any other agency. The school should inspire the children with this spirit, but the church only can carry on and out the cultivation of self-denial among people of all ages and classes. The sign under which it claims to live and work and by which it has ever conquered, is the cross. Only by raising up cross-bearers in social and civic self-denial, will it win from the state and society its crown. Only by yielding this service as its most fundamental obligation to the community, can it expect the popular recognition of its right to be and its room to work.

DUTY OF SELF-SACRIFICE.

Imperious to the interests of both church and community is the religious imposition of the duty and privileges of self-sacrifice in public service upon every conscience and heart. To impart this power of self-denial the church must be mastered by it herself. To give it she must not only have it but exemplify it. Upon a much farther-sighted view of non-sectarian policy and of inter-denominational comity and co-operation, will depend not only the importance of the church in the life of the community but also the moral and financial support which the church may expect from the people. It is sure to become more of a question whether the churches can survive if they do not sacrifice self interest in saving the life of the people, than whether the people's social life can be saved without the church. Christ's words are as true of His churches as of His disciples, that the church which "will save" its life shall lose it and the church which is willing to lose its institutional or denominational life for Christ's sake and the people's may "find it." With the passion of love for the church, consistent with his larger loyalty to the kingdom, Doctor William R. Huntington plead before the convention of the Protestant Episcopal church the demand which the organization of the world makes for the co-operative unity of the churches. He said: "Four great questions confront the American people at this solemn hour when they are passing from an old century to a new. These questions are: the sancity of the family, the training of youth to good citizenship and good character, the purification of the municipal life of our great cities and the relation of capital and labor. But towering above them all as a snow mountain towers over the more conspicuous but less important foothills that cluster about its base, rises the question of every American citizen who is a believer in the religion of Jesus Christ, how may we correlate and unite and consolidate the religious forces of the republic? Those other questions are in a measure independent of one another, whereas the question of the correlation of the religious forces of the republic touches every one of them intimately, vitally. Our whole attitude toward the unity question depends upon our notion of what the church to which we are attached, is really like. One view is that each church is a little

working model of what a true church ought to be, kept under a glass case, provided with its own little boiler and its own little dynamo, the admiration of all who look at it, but by no means and under no circumstances to be connected either by belt or cable with the throbbing, vibrant, religious forces of the outer works through broad America, lest they wreck the petite mechanism by the violence of their thrill. We sit here debating these petty technicalities, devising the ingenious restraints, and meanwhile out-of-doors the organization of the world goes on."

CO-OPERATION NEEDED.

Wherever the churches are endeavoring to unite to meet the demands of the world's organization they do not find any basis for practical unity in trying to think alike, or worship alike, or be governed alike. As the bond of comity between themselves is the Christian spirit, so the basis of their common service to the community is their co-operative unity. How reasonably practical it is for churches in any community, large or small, to co-operate for the common good, Washington Gladden long ago set forth in his story of "The Christian League of Connecticut." The churches in the state of Maine were among the first to form an interdenominational committee to act as a final court in preserving comity and promoting co-operation. That state of rural communities is thus beginning to find relief from the ungodly sectarian rivalry which is dividing the forces of righteousness hopelessly and is over burdening every little village with a multiplicity of paralytic churches. In New York city "The Federation of Churches and Religious Workers" has successfully set the type for the National Federation of Churches which is pressing the cause of co-operative unity from its headquarters in the Bible House in New York city. But prior to these newer movements the foreign missionaries of all our churches have found it so necessary and feasible to unite their forces in the overshadowing presence of the united forces of evil, that the churches of the home-land are likely to receive the boon of their own unity in return for their chivalrous service abroad.

A working example and demonstration of the advantage of combining our religious resources may be seen in many rural communities in the consolidation of school districts, which makes one strong and effective educational center possible. Why may not several denominational churches, too small for any effective service, unite at least in a common effort to inspire the people of their community with the highest ideals of social and civic relationship, to educate the citizenship in organizing progressive movements and in supplying the self-sacrificing spirit always necessary to realize every hope of progress?

The final test of the capacity and right of the churches to fulfil their high function in the community is not the attitude of the people toward the church but the willingness and capacity of the church to serve the real interest of all the people. The country church which thus serves its community the most will serve itself the best and, within the bounds of its legitimate function, will be a center of rural organization in giving ideal initiative and power to the people.

DISCUSSION.

LED BY K. L. BUTTERFIELD.

When the men who made Michigan came and planted wheat and corn in order that the body might be nourished, they did not forget to build the schoolhouse so that the mind of the new generation might also be fed, and the church to provide that the soul as well might wax fat.

Life was simple in those days, and so were the institutions that ministered to that life; the church and school were vital factors in all social relations. But it was not long before other forms of association grew up, answering to wants which neither church nor school supplied. Agricultural fairs, and societies of live stock breeders and of fruit growers became numerous. Then came associations for some purely business purposes, such as the farmers' mutual insurance companies. Finally there arose what we know as farmers' organizations,—The Grange, the Farmers' Clubs, etc., the object of which included business, social, educational, and political ends.

Today we can appreciate how great a change has taken place. Country life is not as simple as it was, nor are the institutions that affect country life as simple as in those early days. The same fundamental institutions exist, but in new forms, in order that the new wants may be supplied.

Take, for instance, the church. The church building and society do much the same work they used to do. But in how many new ways is religious work performed! Young people's societies, the work of the Young Men's Christian Association, and even Sunday school work, have developed to meet new needs.

So with the school. In the pioneer days the primary school was about the only educational institution the farmer had. But today agricultural colleges and experiment stations, farmers' institutes, home reading courses, farm papers, traveling libraries are of great and growing value to farmers.

So with various farmers' associations. Instead of societies of stock breeders only, we have societies of breeders of particular breeds of stock. Dairy societies have been organized. Many horticultural societies exist. The Grange and Clubs never flourished as they do today. Farmers generally have more organizations and believe more in co-operation than ever before.

The great fact to notice about all this is that while everything is much more complex than it used to be, practically all the various endeavors among farmers can still be classified as religious, educational, or business. This is not a new thought, but one worth notice. It is perfectly natural that practically all the co-operative effort of farmers can be put under one of these three heads.

Suppose we put all the religious efforts under the name of the church; all the educational efforts under the name of the school; all the business co-operation under the name of the farmers' organization. We have then three great rural institutions which have grown rapidly, which seem to be firmly established, and which seem to serve permanent needs of mankind and hence are likely to live long and prosper.

I am aware that it is easy to criticise this classification. The Grange and Clubs bring educational and moral results. The schools help men in business. The church aids socially as well as spiritually. But this criticism would be valid against every classification. For as a matter of fact all these forms of endeavor do overlap not only in purpose but in work and in results. The classification can be criticised also because it seems to omit many important things—the home, the press, free rural mail delivery. But presuppose the home. And nearly every agency for good that can be named will we believe find a place in some one of these three groups, considered broadly. Let it be remembered that I include within the word church every agency that is primarily religious; within the word school, every agency such as farmers' institutes, that is primarily educational; and within the words farmers' organization, every associated effort that deals primarily with the farmer as a farmer and a citizen.

The more we think about it, the more we shall agree I believe to fully recognize that these three great lines of work must be kept up and that the church, the school, and the farmers' organization are the great and necessary institutions which shall make rural life better and more satisfying and more attractive.

If we all do agree upon this conclusion, I have no doubt we may also agree that

the future promises to see a great development and growth in church, in school, in farmers' organization. At this meeting we have been shown how the country church can do twentieth century work; how the country school as well as the agricultural college can help the farmer as a farmer and as a man; how the possibilities for farmers' organizations are only beginning to be developed.

If now we believe that the church, the school, and the farmers' organization are the fundamental and the necessary rural institutions, when broadly defined to include all efforts for the spiritual, mental, and material welfare of farmers; if we believe that all three are destined to a greater expansion and a wider usefulness, the next question is, shall each of these institutions do its own work, in its own way, without paying any attention to what the others are doing; or shall they all try to work together?

There are no doubt enthusiasts in each institution who would go so far as to advocate that one particular institution is sufficient. To use the words of a recent writer, "The church should be *the center* of the religious, social, intellectual, and esthetic life of every rural community." I quote still another writer, who urges the propriety of making the schoolhouse *the center* of community life;" meaning evidently that the school should be the means of uniting all the social and educational forces of the neighborhood. And there is occasionally a member of the Grange who seems to feel that when it is stated that the Grange tries to benefit the farmer financially, socially, intellectually, and morally, therefore it is the chief or only institution needed in country life, because it covers the whole ground.

There are other people who do not go so far as to *say* that the church or the school or the farmers' organization should be the central force, but who *act* as if they thought that way. There are country pastors who do not appear to enter into sympathy with the farmers' problems; country teachers who have no enthusiasm in rural life beyond keeping the school and getting their pay; farmers who do not show the slightest interest in the mighty work that church and school are doing and may yet do.

But I take it that a different attitude prevails at this meeting. As I understand it, this whole program is based on the idea that there is room in rural life, and not only room, but imperative need, for the religious factor as represented by the church, for the educational factor as represented by the school, and for the business factor as represented by the farmers' organization. And not only that, but this meeting is based on the further idea that co-operation and mutual aid among all these forces are extremely desirable. It seems to me that this is the correct view. If the church cannot become *the* center for *all* rural activities, it can at least become the center for those activities that are more directly religious, and *a* center for many other activities. If the school cannot become *the* center of country life, it can at least take the leadership in all educational work, and no doubt can enlarge its social interests. If the farmers' organization cannot do the work of church and school, it can at least supplement them, besides doing a distinctive work relating to the practical questions of farming, of business, of legislation. Moreover, will it not be better if all who are interested in these movements will agree not to disagree, will admit the necessity for the work of others, and will seek to co-operate.

That is the magic word, co-operate. We hear about the necessity of co-operation among the churches, between teachers and school patrons, among farmers as farmers. But there is need of a still higher form of co-operation, co-operation between church and school and farmers' organization.

This meeting has we trust served to demonstrate the value of this idea of rural social co-operation and to show the need of such co-operation if we are to get the best rural advancement. This meeting has not attempted to show just how this co-operation can be brought about; it will have done its work if it has convinced a few farmers and a few educators and a few country clergymen that "co-operation between all rural forces" is one of the twentieth century watchwords for rural progress.

THE AGRICULTURAL DEPARTMENT AND ITS RELATION TO THE FARMER.

BY HON. JAMES WILSON, SECRETARY OF AGRICULTURE.

The Agricultural Department and its relation to the farmer. It is a plain story. The Agricultural Department is trying to do something for the men who work in the fields, who produce something, whether it is in the North or whether it is in the South, whether it is in the East or whether it is in the far West. Whenever the cry comes to us that some farmer has difficulty, we note that he needs help, that he needs another crop, we turn in to do what we can to help him. The old world has not set us very good examples along this line. I learn tonight that the people of Australia have been here to get one of our educated agriculturists to go down to the antipodes and help them to organize their agriculturists. An agricultural education is something that has had very little attention anywhere until within our day. Away back in the early 60s, in fact in the late 50s, the United States government was donating land to build transportation routes across the country and it occurred to some of them that it might be well to make donations to each of the states so that the farmer and the mechanic might be educated. So in 1862 something of this kind was done. Agricultural colleges were endowed, but it did not occur to the people who contributed for that work that there was no one who knew enough about agriculture to teach anything about it. A man can only teach what he happens to know himself and there were very few people in those days who knew anything about the science that related to agriculture. The best farmers were they who worked on the farm and learned by experience. Many of the sciences that relate to agriculture were not thought of in those days and scarcely any help was given by educated men to the young farmer.

When I went down to Washington I went from an Agricultural college and my resolution then was to do what I could to strengthen the agricultural colleges and experiment stations throughout the several states and territories. I found it would be necessary before I was able to do much in that line to strengthen the department of agriculture. It had not made very much progress. Questions of economy faced those who were in charge of it. I began to call upon the civil service commission to find men to make investigations in regard to this and that feature of agriculture. Advertisements were sent out over the United States to find somebody who knew something about the soil we stand upon, from which we get our living, but I could not find anybody anywhere who knew anything about soils. We had certain investigations we wanted to make about certain plants and it became a necessity that we should know something about the soil. I called upon Congress to give me more money so that I could coax men to come and do soil work for me. It was no use. Congress could not see the wisdom of doing that. It occurred to me to turn to the agricultural colleges and bring the young graduates to Washington and train them along those lines so when a call came for

work to be done somewhere in regard to soils, I could have a man to send to do that work.

For example, Porto Rico is under our control. When our people went there, they were poor. Taxes had been put on their industries throughout the generations. People living in Spain owned the land and never paid any taxes. Taxes were paid by the poor people. I must send a soil thesist down there to find out the kind of soil there, to indicate to the people where they could succeed with this plant, that plant and the other plant. I began several years ago calling upon the agricultural colleges to send me the young graduates and because we have had them at work teaching them soils in the summer, bringing them into Washington in the winter to give them instructions in and outside of our department, we were ready to send a man to Porto Rico in order to tell the people what they could do with this field.

While I was director of the Iowa experiment station, I learned a little about the dairy. Dr. Babcock of Wisconsin had told us that the ferment that ripens the cheese is a native ferment in the milk. The flavor of fine butter and cheese comes from bacteria within the product that reaches it after it comes from the cow. Some inquiries came to me in regard to tobacco. I made some investigation and found we were selling thirty million dollars worth of poor tobacco. We were buying $14,000,000 worth of high priced tobacco from foreign countries. The question came to me whether we could not do something along those lines. I sent for the bacteriologist and said to him, what does science know about tobacco? What is the reason one cigar sells for two cents and another for half a dollar? Had you made any investigations? I happened to know what Dr. Babcock has found out about the influence that ripens cheese, that is a ferment within the milk itself that comes from the cow. Nature provided that and I happen to know that bacteria flavors it, but has this anything to do with flavoring tobacco. No one has ever inquired. We wanted an agriculturist and chemist who could analyze a living tobacco leaf. Couldn't be found. Advertised for them, but couldn't find one. Dr. Kedzie could have done it but he wouldn't have thought of leaving you here and going to Washington, but at last we got a little German who was rated a crank in his own country who could do it. No bacteria could live where tobacco was fermented. We found out that tobacco was a specific for bacteria, and we wanted to know what the ferment was.

The little German went to work, growing tobacco under different conditions, and we began to get a little light. We thought we were doing good work and we published it, and the Japanese saw it and came over and took the little German away. I knew a young man who had taught chemistry and had obtained a Master's degree from Johns Hopkins. I told him my story and he said that he did not know a thing about it. Johns Hopkins never taught that to anybody, and there I was. He finally said he would come and work for his board, and there he is now with another young gentleman who has gone through the same process, and when he knows enough about it, I presume he can tell us what is in the living plant. So we are educating along those lines.

The axmen in the sawmill have been at work. They are working up our last pine trees. I am not going to say anything about this, but we have

to educate foresters also. Sixty students are in the forests in summer studying and in Washington in the winter, and some day the department of agriculture will have foresters who know something about forests. I presume you learned today how many thousand acres they propose to plant next year. How to teach the lumbermen to do more rational work and stop butchering. What to do to stop fires, and all that.

It is necessary to carry on the soil work. I do not know to what extent you people are studying soil physics, but I beg of you to do something if you are not doing much. Up to the present time no attention has been given to the soil. We do not know anything about it. The agricultural colleges naturally should teach these things. Of course you can only carry them so far. We are taking the young men who graduate in these colleges and teaching them specialties, one man wants to study forestry, another wants to study agricultural chemistry, and so on, and we set them to work specializing when we get them, in the hope that the department of agriculture will have the best educated men along the special sciences that relate to agriculture so as to work out the problems for the American farmer. We do not give a dollar's value to work of any kind, unless some farmer wants it done. We are ready to assist a farmer at any time, but to investigate for the love of science, we don't do it and I don't believe Congress would give us a dollar to do it. There are forty young men studying soil physics. You go into the plant pathology class and what are they doing? We had one of them studying your little peach here. We had one of them studying the destruction of cotton on the Atlantic coast. The cotton was dying, a rod died this year, an acre died next year. It behaved precisely as your peach tree. We sent a man down there and told him to help those people out, a high priced plant pathologist. The trouble with the cotton plant was a fungus that attacked it away down more than a foot below the surface. That is what is the matter with your little peach. That is the latest thing we have been doing in Michigan. We have not published the information yet, but we have ascertained that the difficulty with the peach trees in Michigan is a fungus away down below the ground. The next thing is to find a remedy. We saved the seed of the cotton plant. It may be immune. Get all the cottons that grow in the United States and plant them. Some may be immune. Make a hybrid that will be immune. Thus we found the remedy and saved the cotton and it cost the department probably $10,000, perhaps more, but that is the quiet work the department is doing along those lines. Now in regard to your trouble here, we are not going to give up the peach business in Michigan until we find a remedy. We have sent a man to get the original peach from China and bring it here to infuse new blood into your peaches, as it may be immune from the fungous growth that is now destroying your peach orchards. That is something that the plant pathologist is doing. We have two thousand gentlemen connected with the department of agriculture who study science along one line and another. We print every year the result of the work of those gentlemen. We print 600 different publications every year and we send out 8,000,000 copies to the farmers of the United States. We are alarming the United States in the amount of moneys we are asking for and some think we are ahead of our time, but we are not as long as any problem remains unsolved and we want money to carry on this work for the farmers of the United States.

In regard to other influences that are operating, the agricultural

college is probably the foremost. You have one of the oldest in Michigan here if I remember rightly. You antedated the action of congress. The M. A. C. has turned out a very great amount of excellent work. The college at one time was the very foremost in the land but others have come to see your good works and are patterning after you. Look out and not let any of them get ahead of you. The agricultural press is an agency for the education of the American farmer, but the agricultural press never amounted to anything until the editor went to work to get something to put in his newspaper.

Within the memory of you and me, and we are not very old yet, at least I feel young, when good butter was made on the farm, no one knew how much was lost in the buttermilk. No one knew how much of the curd was lost in the whey. There was no uniformity in butter. One of the very latest requests that came to the department of agriculture was from the farmers of southern Georgia. We grow cane, do not make sugar, we make syrup. The trouble is we have no uniformity. Will you help us? We will show you how to get uniformity in making your syrup. A little taste of the cane must be gotten rid of. You must be able to put an article on the market that is honest. I do not care to eat syrups that are doctored with chemicals.

To go back to the butter and cheese. The educated man has taught the American people how to make uniform butter and uniform cheese. We keep a man in China for example, opening up markets for our butter. I have a problem to be solved. You may as well undertake it as any one else. The butter that we send to the China sea does not stand the hot weather as well as the butter that goes from Denmark there. Our butter men in the United States feed the cows a highly carbonaceous ration. If you look carefully into the ration you will find that they are feeding hay and corn, and you know that is a wide ration. The Dane does not feed as wide a ration as that. He sends to the United States and buys our oil meal, cotton seed meal, and he feeds a narrow ration to the dairy cow, and sends all over the world a product that stands up better than our butter. We are up against that. You have the by-products here and you have them in different kinds and you can contribute materially to our help. This is the kind of work that I cannot get done at Washington. I have no cows in the agricultural department. I have sometimes picked out a goose, but I haven't any cows.

In passing along, speaking of the influences that are reaching the farmers, I must not overlook the farmers' institutes. At one time anybody could be called into the club who could tell a story, and after he told the story it was repeated until a new story was told. That kind of talk won't serve nowadays. In a farmers' meeting a man must be well up, bring his contribution that is new and entertaining with regard to some of the specialties connected with the production either of the farm or the orchard. There are a thousand directions in which he can do it, and he does do it, and this education that is disseminated among the American farmers is enabling them to help the American manufacturer, and all people interested in the progress of the United States to carry on their industries. The American farmer feeds his people the best and the cheapest. He feeds the American mechanic well, and compared with other countries he feeds him cheaper.

Let me run over briefly the work of the great bureaus of the department. Take the weather bureau. The next thing we are going to do for

the farmer along that line is to follow up the man who carries the letters to the farmer's house with the forecast for that day. I don't see any reason why the farmer should not get it, as well as the man who lives in town. And I will get it sooner or later, and as fast as they extend the rural free deliveries, the forecast will follow along. I will make a great deal of fuss until they do. The rural free delivery is going to pay. The farmer is taking more papers, he is writing oftener, and he is going to be a profitable customer for Uncle Sam all along the line. I might say another thing in regard to the weather bureau. We are establishing a wireless telegraphy along the coast. We think it will give the indications of the weather several hours sooner. This is not the wireless telegraphy that comes from any other source. We are studying it out ourselves, and we are just as far along as anyone else is though we don't make very much noise about it. We expect to use it 150 miles down in the Cape Henry neighborhood very soon.

The bureau of animal industry is another. The weather bureau spends $1,100,000 a year, the bureau of animal industry does also. We have started out to exterminate several of the diseases now found among the herds of the United States. Sheep scab we expect to exterminate, black leg in calves and young animals. We are doing it by sending the vaccine to the farmers so they can use it freely, and send it for nothing. The vaccine we send out is genuine. It touches the spot every time, and it is certain that if the farmers throughout the country will use that on their young animals and prevent any outbreak, the bacilli will die out. It must die out.

We are looking into the condition of domestic animals at home and abroad. We have the healthiest animals in the world. We permit importations of animals from Great Britain, but we have restricted matters so closely that we will not let them ship in any foot and mouth disease. We won't let them land unless they are examined for tuberculosis. I suppose the people of Canada and Great Britain are just as honest as anybody, but we won't allow their cattle to come in unless our own veterinarians examine them. The British are finding that they must test those animals themselves, and word came to me the other day that the less respectable herdsmen over there are threatening to anticipate our test. Those of you who have read up on tuberculosis and the tuberculin test, know that if you test an animal today and then test it again next week, it will not respond. If I catch those people doing that I will shut out British cattle to the last hoof. We have just as good blood here, and they must not try any of those tricks on the people of the United States. We are determined to protect the health of our cattle.

I might call your attention to something that is being done that would be interesting to Michigan people. We are getting new varieties of wheat. The way by which you get varieties of wheat is to hybridize. We are cross breeding wheats in the United States and selecting from the hybrids. We are cross breeding so as to get cold resisting varieties. Selecting from these hybrids a gain of several bushels to the acre has been made in the way of progress. We cross the Japanese variety of orange with the Florida orange. Out of five thousand young hybrids, if we get one sweet orange, we will revolutionize the growing of oranges all over the United States, because the beautiful seedless naval orange that grows on the Pacific coast sprang from one tree that we still have in the department of agriculture. We have set out five thousand young hybrids,

and if we can succeed in getting one sweet orange, we can multiply it. We did get something interesting, we got several very fine orange plants, but that is the way you get varieties, you do not know what is coming. You don't need to hybridize when you reach perfection. Our corn fields in the west have been immensely improved by the one process of selection. We select our seed corn with a great deal of care. The department of agriculture carries on this work in conjunction with the experiment stations in the several states. You all know what macaroni is. It has never been made in the United States successfully because we did not have the wheat to make it from. It is entirely different from bread wheat. It grows in the semi-arid regions of Europe and Asia and it is very different from that of bread wheat. We have been importing it for the purpose of getting a crop that would grow here. A mill has been started in Cleveland, Ohio, for the purpose of making American macaroni. It could only buy 15,000 bushels because the farmers refuse to sell any more. Next year, however, we will make our own macaroni and you will have a clean dish without any of the bacteria of lower Italy in it.

We set out in our department to lower the amount of produce we are buying from foreign countries. In 1900 we bought 440 million dollars worth of stuff from foreign fields, and raised 840 million dollars worth. My job is to help the American farmer to produce that 440 million. One-half of that amount can be produced in the United States and the other half can be produced in the tropical countries. The brown men who live in the tropics are being taught how to produce 200 million dollars worth, so that they will have the money to buy the things we make here. We have just sent men to the Philippine islands to teach those people to produce what we cannot produce.

Let alone the things we can produce here, because the American farmer is going to be entirely irresistible in regard to what he can do. There are a few things that we cannot produce. We cannot produce rubber, we cannot produce spices, and these things I am proposing to teach the brown men of the tropics so they will have pocket money to deal with us. In regard to other things, sugar, etc., it is only a question of time till we will produce them. The people down along the Gulf of Mexico set up a Macedonian cry that they were trying to grow rice and didn't have the right kind, four years ago now, and they wanted help. Their rice was carbonaceous and some forty-seven per cent of it broke up in the threshing. The department of agriculture thought a rice might be found somewhere in the earth that would be more nitrogenous, more flinty and not break up so much in the threshing. As soon as they found what they wanted, they produced all the rice used in the United States, and next year we will begin to export rice.

Down in South Carolina away back in the time of one of my predecessors, twenty or thirty years ago, an attempt was made to grow tea. They got the plants, got the land, and put them in charge of a theological student who spent part of the time in studying and the other part in cultivating tea. The tea business was a failure. I made some inquiry into the conditions and found that there was quite a prospect of producing our own tea in the United States. We buy some years 11 million dollars worth and some years 14 millions. I found an intelligent gentleman to take charge of the plantation. He told his colored neighbors that he would send their children to school, but they must pick his tea for him two days in the week and he would pay them. I saw that

operation. There were forty little colored people from seven to fourteen years old, getting their education in that schoolhouse, and picking the tea twice a week for Dr. Shepard. They did not earn much money, but the average colored man works for 45 cents and if a couple of little pickaninnies could earn that much it would be a help. Last summer in the attempt to make green tea an interesting fact was ascertained down at Somerville, South Carolina and at Tokio, Japan, simultaneously. They found that there is a ferment within the tea and as soon as you pluck the leaf, that ferment has the power to turn it into black tea. They got a steel cylinder from Great Britain and we had it about a week when they improved it so materially you wouldn't know it, raised the temperature to 400 degrees F., and they made green tea in forty minutes, preventing it from associating itself with oxygen and blackening the leaf. The discovery was made at the same time in Tokio, Japan. I would like to drink my tea made without chemicals,. picked by clean and neat young people. Out in the Orient they get into the tea boxes with their feet, and I understand they perspire in those warm countries.

We are studying how people should be fed. The young gentlemen in the feeding classes here can tell you, if you go with them into the farmer's barnyard how to compound the timothy hay, corn, roots, oats, etc., to feed to the domestic animals so as to economize the feeding. Everybody knows very well there is no use in trying to feed a work horse on straw. He wants more nitrogen, perhaps more protein than is found in that straw. What plants have it? The mill feeds all have it. Can we feed the horse on mill feeds, on oil cake today, possibly something else tomorrow? Very nice calculations must be made. The experience of old farmers teach them, and it has been the experience of their fathers and grandfathers, but maybe the old folks miss it once in a while.

A good deal of progress has been made along these lines, but did you ever have any lessons to any extent given with regard to the feeding of babies and working men and old men and old ladies. Very little is done along that line in any country in the world. Congress gives us money to inquire into that. Look at the tables set before you and eat everything you can see, and I don't know just what the result would be. We know that poor people who are not able to buy enough nutritive food are not able to do the work of the people who are able to set the table in good shape. We know that the people who have more beds than they can sleep in, more chairs than they can sit in, and so on, are not the healthiest people. The two extremes do not give satisfactory results. Nature gives us some very interesting lessons with regard to feeding. Nature has provided milk, a perfect ration. Nature will take care of the calf turned out in the green grass, a perfect ration. You can make no improvement on nature. So we are studying along these lines.

In regard to the use of the by-products of your sugar mills. I took an interest in the beet sugar propaganda, because I knew the American farmer needed that kind of an addition to his crops. We will not discuss politics here or say anything about what the money making power may do or may not do. When I went to the Iowa Agricultural College experiment station to try to build it up and get some young men to go there and study the sciences relating to agriculture, I found it necessary to build up the herds. I found it necessary to send to Chicago fat cattle to make the farmers listen to me. The finest car loads that ever

went into Chicago couldn't have been sent without the root. Here is a nutriment within your reach. The farmer of Iowa can make first rate butter from the turnip, but I could make the finest flavored butter from the sugar beet and you can do it from the sugar beet pulp, and your sugar beet business ought to be conducted so that the farmer who has a dairy of cows should grow patches of beets for the very purpose of getting the by-product to feed to his domestic animals. He cannot do as good work in fattening any animal on the farm without that pulp as he can with it, and if you would thoroughly appreciate the value of that by-product, feed it to every animal on the farm. It will save you from buying the by-products from the mills. You don't have to buy bran, oil meal or any of those meals. You are independent and when the times comes that you are independent, you can snap your fingers at the cane sugar men in any of the islands of the sea.

DEPENDENCE OF AGRICULTURE ON TRANSPORTATION.

E. A. PROUTY, INTERSTATE COMMERCE COMMISSION.

The farmer is at the basis of all industries in the United States. There is more capital employed, there are more laborers employed, the value of the product is greater than that of any other industry. Next to the farmer comes the industry which I represent, the railroad. In point of capital, in point of laborers employed, in point of the value of services rendered, the railroad stands next to the farmer. I am to discuss for a minute tonight some of the relations between the farmer and the railroad. As your presiding officer has told you, I am a member of the Interstate Commerce Commission, whose duty it is to hear complaints. Just at present we have a complaint which is called on our files the "Hay Case." The question raised is as to an advance in the hay rate. You raise I believe some hay in the State of Michigan. The better grades of that hay are shipped to eastern markets, New York, Philadelphia, and Boston. Now this change in the rate makes a difference of about $1 a ton in the expense of getting hay from most portions of Michigan to those markets. The price of hay in New York and Boston is fixed by New England and by some portions of Canada and by New York, so it comes to this. If under this new rate which has been in effect since 1900, you send your hay to market in the east, you get one dollar less for it. I suppose wou raise from one to two tons an acre, in other words this advance has made a difference of from one to two dollars an acre in the net producing power of every acre of land in the State of Michigan which is devoted to the raising of timothy hay. In 1893 the grain rate from the Mississippi river to New York was 29 cents a hundred pounds. Six years later that rate had fallen to 13½ cents a hundred pounds, a decrease of about seven cents a bushel. The average yield of corn in the state of Iowa is about 30 bushels to the acre. Assuming for a minute that the farmer had the entire benefit of this decline in rates, it would make a difference of $2.10 in the net producing power of every acre of land in the state of Iowa which could be devoted to the raising of corn on a six per cent basis,

an addition to the value of Iowa land of $35 an acre. I don't mean that these changes have affected values in the way I indicated. You raise a great many other things besides hay here in Michigan. The farmer of Iowa can send his corn to market by the bushel or he can send it to market in fat hogs and fat steers. The freight rate as applied to all commodities fixes the value of your lands and the value of the product of those lands.

In taking some testimony the other day in the state of Nebraska I ascertained accidentally that the product of a creamery located there was largely marketed in Lowell, Massachusetts. The largest creamery in New England, and I think the United States, is located at St. Albans, Vermont, in my own state, and I happen to know that that creamery markets its product in Lowell, Mass., and when I looked up the freight rate to see how they could do this, I found it is 1,700 miles from Omaha through St. Albans to Lowell. It is 230 miles from St. Albans to Lowell. The cost of transporting a pound of butter from Omaha to Lowell in an iced car is one cent. The cost from St. Albans to Lowell is one-half cent. You see the freight rate has absolutely abolished distance. For the purpose of making butter to be sold in New England, a cow in Nebraska and an acre of land which will grow grass or corn fodder on the plains of Nebraska, is worth just about as much as that same cow or that same acre of land among the Green mountains. And so I might stand here during all the time allotted and multiply examples to show you in what way the railroads affect the farmer. It determines what crop he shall raise. It determines in what market that crop shall be placed. It determines the value of that crop. It determines, in a word, whether the farmer shall be prosperous or the reverse, but I am only telling you what you know, for every farmer knows from his own observation the dependence of himself upon the railroad.

I want to direct your attention to another phase of this problem, a phase which is important, and I do it because I hope that every person present who listens to me will carry away with him a single thought which I shall try and impress upon and make plain to you. Now at the basis of this thought lies this fact. The relative freight rate is of importance to the man who buys and sells. That a freight rate should not be too high is important to the man who produces and the man who consumes. Some farmer here has a thousand bushels of grain to sell and there are two or three merchants who are competing in the purchasing of that grain. Now it does not make the snap of your finger's difference to any one of those merchants what the absolute rate is, provided he pays the same rate as his competitor does, but if any of them has the advantage of his competitors by so much as one-eighth of a cent, that is sufficient to give him the market and drive his competitors entirely out of the market. Now you with your grain to sell do not care the snap of your finger to whom you sell it. What you want is the good price and the price which that buyer can pay you depends absolutely upon the rate which he has to pay the railroad company. Now you take the hay case. There was an advance on the average as applied to all the hay which was transported of about 40 cents a ton, by changing from the fifth to the sixth class of merchandise, which amounts to more than four million dollars, a permanent addition to the railroad capitalization of this

country provided that rate is maintained. Who pays that? It was said in argument before us that didn't much of anybody pay it. Somebody who buys two or three tons of hay, does he pay it? Some farmer who sells a few tons of hay, does he pay it? This does not amount to anything. Well, my friends, somebody pays $4,200,000 a year and while it is not possible to put your finger on any individual and say this man pays it or that man pays it, it is possible to say with absolute certainty that ninety per cent of that enormous sum of money is paid by people of the United States who have incomes ranging from $300 to $600 per year. It is paid by the poor people of the United States and it is paid to the rich people of the United States. Right, extremely right and proper if the advance is just, extremely wrong if the advance is unjust. Thirty millions of people are either agriculturists or the families of agriculturists. The greater part of that four millions is paid by the farmers of the United States, and I want to say this further thing, and impress it upon the mind of every farmer before me, that no class suffers from these monopolistic combines like the farmer. If the freight rate is advanced by the railroad, the railway capitalist can well afford to give some of the unreasonable rate to his employee. If the steel trust makes, as it does, $15 a ton on every ton of steel rails it sells for $28, it can well afford to give some portion of that extortion to the laborers who manufacture that steel rail. If the anthracite coal combine, as it has, advances the price of anthracite coal 50 cents a ton, it can well afford to give to the miner as it has 10 cents of that advance, keeping 40 cents for itself, $25,000,000 a year, five millions to the miner and twenty millions to Wall street. That is the history of the coal combine.

But the farmer cannot take advantage of any combine for the very nature of his occupation is to prevent monopoly and combine, so I say of all clases the farmer is that man who cannot recoup himself and he is the man who loses most by these monopolies. Bearing these facts in mind, I want to suggest to you one thought which grew out of the investigation which our commission had the other day in Chicago into what is known as the Northwestern Merger, that conbination of railroads which is in all the newspapers and everybody's mouth, and you of all people are that class whose voice and whose influence have got to make this thing right, if it is ever made right. Stretching from the head of Lake Superior 5,500 miles with their branches are two transcontinental railroads, the Northern Pacific and the Great Northern, and they are the only railroads which operate in the section through which they extend. These two railroads, the Northern Pacific and the Great Northern have been combined as one road. These two roads so combined have bought and now operate the Burlington road. Every particle of competition which formerly existed in that whole section which those two roads operate has been obliterated. It has become possible for one single man to fix the freight rate which that whole section shall pay. What was the financial part of this transaction? I think you can understand it. The Northen Pacific and the Great Northern bought the Burlington. They bought it by buying the capital stock of the Burlington, $100,000,000. These two roads paid for it in round numbers $200,000,000. They paid for it by issuing their bonds, the joint bonds of the two roads. In other words they increased the capitalization of those two roads by that trans-

action $100,000,000. Mr. Hill said in his examination before the commission that the Burlington stock was worth what they paid. In 1897, March 31, the stock of the Burlington was worth $72 a share. Great Northern was worth $120. Stock of the Great Northern is worth now $180 a share. On that basis Burlington was never worth more than $130. The point is this, stock is entitled to whatever dividend it can earn, and you have put up against those corporations an obligation to pay $200,000,000 at four per cent interest. Who buys one of those bonds holds the obligation of those companies. Who bought a share of Burlington stock bought it with notice of what its value had been and have notice of what its value might be.

Mr. Hill has organized a Northern Security Co., and he exchanges the stock of the Northern Security Co. for Great Northern at 180 and for Northern Pacific at $100 a share. When Great Northern was worth $150, Northern Pacific common sold for $23, and Northern Pacific preferred sold for $62. They now go in together and a common stock is taken out on the basis I named. That transaction adds to the capitalization of those companies $50,000,000, and this is what has been done. You have throughout that whole territory eliminated competition. You have increased the capital stock of those corporations $150,000,000. Now I suppose you all know what $150,000,000 mean, but it does not mean anything to me unless I can put it in concrete form.

It cost to build the Great Northern road $98,000,000. This addition to their capital stock is as much as it would cost to build and equip the Great Northern and half another road just like it. What is the object, the purpose of this combination? Mr. Harriman told his story, and Mr. Hill told his story. These gentlemen say they have gone into this scheme for the purpose of benefiting the Northwest, for the purpose of reducing freight rates in the Northwest. That testimony was a revelation to me. I supposed they had gone into that for what there was in it, but instead they are broadminded philanthropists.

While Mr. Carnegie has been traveling over this country establishing libraries with the proceeds of steel (steal), these gentlemen with just as great hearts have gone to work to reduce freight rates in the Northwest. Business propositions should be discussed on a business basis.

Of course you know, and I know, and everybody else knows that they are in that thing to make money. How are they going to make money? Going to develop traffic. If you take a half dozen railroads that are not good for anything, put them together, make a great system of them, furnish the money to put them in good physical condition, you benefit the community. But that is not the condition of things at all. There was the Great Northern, a complete system by itself, all the money it could use, one of the finest roads on this continent. The Northern Pacific, a great system by itself. Such men as Morgan with all the money it could use back of it. How are you going to develop any country by combining these roads? The chances are that there would be better service and lower rates if those great systems were operated independently than if they are operated together.

Then what is the purpose, how do they make money and how can they make money? There is only one way if the traffic is to be the same. The revenues of those roads can only be increased by charging more for

this service which is performed. It can only be increased by imposing upon the transportation of that whole section, a greater transportation charge than would otherwise be imposed. Let everyone take that thought home to himself. It is just as certain as any logical, demonstrative conclusion of a proposition in geometry. You must in some way get more money out of that traffic from the people who pay for the traffic, or the scheme is not a success.

He says there is no danger that freight rates can be advanced. Freight rates have gone down and down and they are still going down within the the last ten years they have gone down and they are bound to fall even though you wipe out every particle of competition. He produces figures to show it. In 1890 the railroads of this country hauled 72 billion tons one mile. In 1900 they hauled 141 billion tons one mile, an increase of 100 per cent. In 1890 the gross receipts were one billion fifty-one million. In 1900 they had risen to about one billion four hundred seventy-eight million, an advance of nearly 41 per cent. Now, says Mr. Hill, just in proportion as the number of tons carried has increased faster than the gross receipts, just in the same proportion has the freight rate fallen.

When I was a boy in the district school, I remember that my seatmate came in one morning with an example that stuck me. If potatoes are a dollar a bushel, how much will it cost to shingle the schoolhouse? There is just as much connection between the rate per ton per mile, and the freight rate, as there is between the price of potatoes and the cost of shingling this building. Suppose Mr. Hill transports a car load of first class merchandise ten miles and gets $100. Next he transports a car load of low class merchandise and gets $10. Then he transports one car load of each kind and gets $110. Then one car load of the first class merchandise and two car loads of the low class and gets $120 or $40 a car. The rate per car, the rate per ton per mile has fallen, but the freight rate is just exactly the same.

On the whole it is my conviction that freight rates have risen rather than fallen. There are more instances of an advance than there are of a decline. I say that wherever they have fallen, that decline has been due entirely to competition between railways and wherever freight rates have been advanced that advance has been made possible by the elimination of competition between railways. Up here in this Northwest you have wiped out that competition, you have put it into the hands of one man to say what rate shall be paid. My friends, this is not right. The same thing is being done everywhere and no amount of theorizing can convince you that it is right. If your baker and your butcher without any competition has a right to say what you would pay, they would rob you in the end. The particular baker who sits next to you in church might not rob you, but in the long run he would, and one man will rob that section if given the opportunity to name the freight rate. It is human nature, it is common sense, it is common experience that they will, and the people of the United States will never rest content with any such condition. What is the remedy? The obvious remedy is to compel by law competition; to prevent by law combinations. I do not think you can apply that remedy. It would not be a very effective remedy if you could. Suppose you dissolve the Northern Security Co. Substantially nothing would be accomplished except to wipe out a little of this

overcapitalization. These two railroads are owned by the same men. They are friends and you cannot compel them by any sort of legislation to fight.

What is the remedy? There is a remedy, perfectly just, perfectly equitable, approved by every court that ever held it under consideration. The railroad is a public servant. It discharges a public duty and the public may determine what compensation it shall receive for that duty. Sometime or other we shall apply that remedy. I think in the first instance Mr. Hill should be allowed to make his own remedy, but when that has been done there should be some tribunal somewhere which shall determine whether his rate is just and reasonable, some power to compel him to charge a rate which is just and reasonable. Now then when that remedy is applied, how stands the matter? When we get around to apply that remedy how are we then?

I said during the examination incidentally, that the great evil growing out of these combinations lay in overcapitalization. The Railway Age of Chicago referring to that remark said there was no connection between overcapitalization and railway rates and it was singular that a member of the Interstate Commerce Commission, who ought to know better, did not know better than to suppose that there was any such connection. The Railway Age is a very great power in railway matters, and I have been in doubt whether the gentleman who wrote that editorial is a very close student of railway matters.

Ten years ago the state of Texas, believing its railway rates were unreasonable, created a commission and instructed that commission to formulate a schedule of rates which the railroads of Texas were ordered to observe. They did so and the Supreme Court of the United States enjoined the state of Texas from enforcing those rates because they did not permit a return upon the capitalization of the Texas roads. A little bit later the state of Nebraska, smarting under what it thinks unfair freight rates made a schedule of freight rates which the roads should not exceed. The Supreme Court of the Unted States held that that law could not be enforced because the rates did not suffer those railroad companies to earn a fair return upon their capitalization. The experience of the state of South Dakota was exactly the same.

Take this hay case that is before us now for consideration. The point urged with the greatest effect, the point which we must consider, the point which may prevent us from reducing that rate, or would prevent us if we had the power, is the fact that those railroads are not earning a fair return upon their capitalization. In finding a reasonable rate, whether that question is decided by the railroad or whether it is decided by the government in revising the rate, the only thing to be considered is the capitalization of the railroad. If in time to come, I am asked to fix a rate on the Great Northern Railroad, must I not take into account the fact that those $200,000,000 of bonds have got to be paid, and the interest got to be paid? If you buy a share of Northern Security Stock for $100, must I not take into account the fact that you have paid $100 for it? I say to you that one of the great faults in our present financial condition is overcapitalization, not only of steam railroads, but of every quasi-public service. Your electric light plants, etc., whatever performs a service which the government may promote and for the performance of

which it may regulate the charges, overcapitalization in corporations of that sort means unjust taxes.

It was said by a lawyer that no man dared to invest a dollar in railroad stocks. There is a glimmering of truth in his suggestion, but why? Is it for the reason which he intimated? That people fear the government may unjustly interfere with the government of these railroads? It is because you do not know what speculator will buy up that railroad tomorrow and wreck it for his own purposes. It would be interesting to know how many miles of railroad in this country honestly built and honestly operated, have gone into the hands of a receiver. Railway stocks do not today pay a return and are not today worth par. I could not find a better illustration of my proposition than the Great Northern Railroad itself. There is a railroad stretching from the Mississippi to Puget Sound. It never received a dollar of government aid. There stands against it today no penny of bonded indebtedness. It was built out of its capital stock alone, and never did that stock fall to par and never did it pass a dividend. All honor to that sort of an enterprise. All honor to the man who conceives that sort of enterprise. No property the American people can hold is more secure than that property.

Just south of it is the illustration of another side. Built with government aid, the pet of speculators, a little bit more cost but practically the same. Its capitalization is not 98 millions like the Great Northern, but 327 millions 3¼ times as much.

When J. J. Hill in the vigor of his days was pushing his great railroad to the Pacific coast, he was in truth a captain of industry. In his maturer years he has fallen into bad associations. He has gotten into Wall street. They have taught him that the easiest way to possess wealth is to get money not make money. He is engaged in the attempt to create $150,000,000 out of nothing. My friends, that he cannot do. No one ever yet did, ever yet created something out of nothing. If he gives permanent value to his $150,000,000, it is because you and I and our descendants pay it in unjust transportation charges.

AGRICULTURE AND THE HOME MARKET.

PROF. E. D. JONES, ANN ARBOR.

I wish to introduce my subject by a quotation. It is taken from the writing of Wm. Gregg, an early promoter of manufacturing in South Carolina, and it dates from 1845, a time when the south was exclusively agricultural. It is as follows:

"Agriculture, to flourish, must have a market for its surplus productions. And what is a market? Does that magic word reside in any place? Most people seem to think so. A market is everywhere. It is people, not a place—people not engaged in agriculture but employed in the production of something which supplies a human want. And the nearer it is found to the farmer's door the better, the less of his productions are spent in getting them to market. Agriculture can flourish then only

where there is a large population engaged in manufactures and commerce. Hence the second source of national wealth is manufacturing industry. No nation ever became wealthy by raising the raw material and then exchanging it for the manufactured article. The manufacturing people always have the advantage. They may work day and night, summer and winter, in fair and stormy weather. An agricultural people work only in the day time, when the earth is free from frosts, and when the clouds are not disburdening themselves upon the earth. A manufacturing population can avail themselves to any extent of the aid of machinery. The fall of water in the town of Lowell is made to do the work of a million human beings. Everthing the farmer raises must be brought out of the earth by main force, by hand work. The farmer's productions are bulky and are often almost consumed in getting them to market. The manufactured article is usually comparatively light in proportion to its value. The farmer, moreover is obliged to take the chances of unpropitious seasons and occasionally a short crop. But no variation of the seasons has ever been known to produce a short crop of boots and shoes, and no drought has ever been so great as to blight the labors of the loom. With these advantages a manufacturing people will always continue to keep a purely agricultural people in debt. Towns and cities will spring up among them and the very fact of a condensed population gives them great advantages. An exclusively agricultural people in the present age of the world will always be poor. They want a home market. They want that enterprise and activity which is engendered merely by bringing masses of people to act upon each other by mutual stimulation and excitement."

The points which I wish to bring before you are three in number.

First, That it is to the advantage of agriculture that the present sharp distinction between agriculture and manufacture should be to some degree broken down and the present geographical separation of one from the other be decreased.

Second, That to accomplish this such manufactures as depend upon purity of materials, artistic quality and the manual skill of the worker rather than upon power machinery and the division of labor, should be promoted in the smaller cities and villages of the agricultural regions of our country.

And finally, if a manufacturing population is, in this way brought near to the agriculturist and affords him a market, agriculture should promptly be diversified to satisfy as many of the requirements of the local market as possible.

Let us take up these propositions in order. Before the days of steam and of the factory system and the railway, agriculture and manufacture were closely joined. They were always in the same regions and often in the same family economy. The manufactures were thus more evenly distributed over the area of the country than now.

The great inventions made by our forefathers led to a wonderful increase of the productivity of manufactures. This increase so powerfully impressed the world that the evolution of the new system was permitted to have full sway. By it agriculture and manufacture have been cut assunder and the manufactures highly concentrated in certain regions. This separation has led to a great increase of commercial movements

and progress in the arts of transportation. The effect of this new system of things with production on a large scale, steam as a motive power for factories and a division of labor between man and man and also between regions has been undoubtedly to greatly increase the prosperity of all members of society. Any principle, however, may be overdone and overemphasized. The physical world is not based upon a single law of matter, nor is the industrial world in its just equilibrium when it is based upon a single economic principle. I do not propose to belittle the great gains which have come to the world through specialization and production on a large scale but if we cultivate this principle alone and too continuously we are liable to neglect the wide range of arts which require skill and manual dexterity rather than mass production and we are also liable to neglect the proper correlation of industries necessary to a well balanced industrial society. It is possible that in setting aside one region for manufacture and another for agriculture and in the consequent movement of goods back and forth we have come to do more shipping and countershipping than is really profitable.

In America specialization by regions has always been strongly marked both in the extractive and manufacturing industries and nowhere have these twin handmaids of society been so sharply divided from one another. The history through which our country has passed, involving the early populating of an Atlantic strip of country and the gradual westward pushing of the frontier of settlement has brought it about that the more intricate manufactures which normally appear only in an economic society of some maturity and resource were first rooted in the east. The west became accustomed to look to the east and to know the qualities and brands and firm names of the east. This industrial geography in which the west and the south have been largely agricultural and the northeast manufacturing has compelled the farmer to sell in a distant market and buy from a distance and a considerable fraction of his energy has been devoted to paying the costs of transportation and middlemen. We appear in this country to go on the assumption that other things being equal we should buy from the largest center of production. Should it not be rather that, other things being equal, we should look for our supplies as near home as possible.

I have no doubt that every day many car loads of goods enter this State and are distributed to all parts of it, coming from distant producing regions, while at the same time car loads of practically the same goods leave the State to seek distant markets. We often buy and sell in New York where we might with more profit buy and sell with our neighbors. If Michigan people knew more about what Michigan produces and would patronize themselves, where price and quality permitted, they would greatly advance the prosperity of the State. Within reasonable limits, I think, our policy should be to send out of the State as little as possible of new materials, as much as possible of completely elaborated products. Thus saving for ourselves as many as possible of the profits of the correlated steps in the production of goods. We need to mingle more thoroughly in every community the necessary elements of a normal industrial society.

In pursuing this policy it is manifestly necessary to make a wise selection of industries. The location of suitable raw materials and motive power, of an adequate labor supply and of shipping and banking facilities

must control many lines of business. There are some lines of manufacture in which this State will probably never be eminent and the limitations of our growth should be clearly understood.

It has been a slow process to bring manufactures to the west. The center of population is now in the middle of Indiana while the center of manufacture is east of it in the middle of Ohio. Throughout our history as a nation manufactures have been highly specialized and concentrated regionally. Thus we distinguish the manufacture of boots and shoes around Boston, of textiles in the Blackstone valley, of silk at Paterson and New York, of brass ware and cutlery in Connecticut, of iron and steel in western Pennsylvania and eastern Ohio, of carpets at Philadelphia and Yonkers, and of canned goods at Baltimore. This State holds a very creditable position in manufacture. There are in addition to the State's saw mills, flour mills and planing mills, its prominence in beet sugar, stoves, agricultural implements, prepared foods, salt, gypsum, cement, paint, varnish, wooden ware, furniture and cabinet-makers goods.

In addition to the prominence of these interests there is another characteristic of the industries of the State to which I wish to call attention. It is that the State is quite marked for the number of small manufacturing establishments to be found in its small and middle sized cities. This is a most valuable tendency in the State's industrial growth and one which it will pay the agricultural interests to favor and promote. While as we have noticed certain families of manufactures are seized and firmly held by definite regions of our country because of raw materials or the necessities of production on a large scale there are other lines of manufacture open to the enterprise of almost any normal agricultural region. Such are the manufactures producing goods of which the novelty of design or artistic quality or finish are the principal points of importance—goods in which purity and honesty in both material and manufacture count for much or in which hand work is prized for its own sake.

We import annually millions of dollars worth of hand-made and shop-made products from Europe to satisfy the taste of our people for hand-made wares which possess value for their style. As our national wealth increases more of these goods will be wanted. Is there any good reason why we should not begin to produce in this country, lace, Hamburg edgings, Plauen goods, carved furniture, bric-a-brac, fine hand-made rugs, gold leaf, cut gems, and inlaid work. While it may not be found profitable to combine agriculture and manufacture as in household manufactures of Europe it would seem as if many sections of our county would be profited by the location of small industries of the class mentioned as well as those which seem as a sort of extension for the raw material industries of the region and which are closely knit to them.

To make plain my meaning, I would ask why more canneries could not be supported with profit in the State, why from the surplus of our fruit crop jams, sauces, marmalades, candied and evaporated fruit or cider and brandy could not be made. The beet sugar industry is a type of a close union of agriculture and manufacture and its successful development in the United States will mean the triumph of a sound correlation of businesses. A similar close relation between agriculture and manufacture exists in the production of cheese. This class of manufactures which lie on the border line of agriculture and within the reach of agri-

cultural villages is large. Besides such table products as have been mentioned above one thinks of mustard and catsup, evaporated celery and the 101 food delicacies canned in glass which our fancy grocers usually obtain from a distance. There is to mention besides potato and corn starch, fancy and cream cheeses, pate-de-fois, perfumes, maple sugar, charcoal, wood alcohol, ax and implement handles, brooms, pulp, fancy brick, tile and terra-cotta.

The success of the Roycrofters at East Aurora, N. Y., of the United Crafts of Cabinet Makers and Leather Workers at Eastwood, N. Y., and of the Elmscott Press show what a persistent devotion to art and original ideas will accomplish. We have some of us gotten into the way of thinking that there is no use of any neighborhood, which is without coal or iron or a port or a dozen railroads, trying to do anything more than the rough work of carrying the wood and water for industry. So long as any community thinks that way it will be given the hod-carrier's work. But the truth is that almost any village has within it capacity to make a product which will be admired throughout the country and will make it the Mecca of some craft if only the man of genius and perseverance can be found who will utilize the labor and materials at hand. Linen is but linen yet we go to the west of Ireland for hand made handkerchiefs. Wool is wool, but we pay three and four prices for the rugs of Turkestan made of a very coarse wool at that. Wood is everywhere plentiful but we get carved images from Oberammergau and toys from Sonnenburg. The geography of skill, experience, genius and perseverance is not like the geography of coal and iron and no community need despair of its future until it is willing to admit that it has not within it, and cannot acquire, any of these great determinative factors of profitable industry.

I have intimated that the development of this neglected element of our industrial economy involves the finding again of the proper industrial function for the small town. The great cities have been growing inordinately with us for many years. This fact is thought to prove the universally profitable character of business on a large scale—of concentration. As I have already intimated I believe this indicates lack of careful study of the correlation of industries. I think it also shows the neglect of the crafts as distinguished from machine production. Our villages stagnate with abundance of unused labor talent. Nowhere in Europe are so many idle grown men to be seen as hang about the groceries of small American villages and cities. Yet nowhere is the rush of business so intense as in the great American cities. The village is a great unused American force. None will benefit more than the farmer if the small village shall find a new function in the industrial economy by equipping itself with such manufactures as do not involve great use of power or machinery but rather depend upon cleanliness, care, honesty of manufacture, the skill of the work, enterprise and art.

A word more and I shall have finished. It has been my thought that agriculture will profit from a diversification of manufactures involving the development of the work shop industries and the establishment of these in regions where labor and living and materials are cheap—that is close to the agricultural community. But success along this line depends no less upon agriculture adopting diversified production so that as many of the needs of neighboring markets shall be supplied as possible.

Mr. John Hyde has told us that territorial specialization has always been a leading characteristic of American agriculture. Without doubt this has been caused by conditions which are now in process of alteration. It was forced upon the west while the virgin fertility of the northern prairies and plains was being eaten up in extensive farming for wheat. It was helped on by the immense productivity of corn in the corn belt and the utilization of this food of the new world in the cattle industry. In the south cotton has long held sway. For some time, however, it has proved profitable for the farmers, in part, to break down these regional specialties. The northern wheat farmer has gone into flax or cheese production the "corn belt" farmer into fruit raising, truck, broom corn and the creamery industry, while the southern farmer plants about as much corn as cotton and raises hogs and cattle.

It is an element of stability in her industries that Michigan agriculture has not been slavishly devoted to the staples. To the profit of all concerned this State has been noted for orchard and small fruits, celery, lettuce, poultry, melons, potatoes and truck growers products.

The diversification of agriculture coupled with a diversification of manufactures sufficient to permit a closer union of these industrial arts, if it is not pushed beyond the limit set by other necessary economic principles, will tend to develop the friendliest and safest and most profitable market for the farmer—the neighborhood market, will economize the expenses of shipping, permit a closer harmony between soil and crops and a safer and more scrupulous agricultural practice and by finding a function for the village, utilize labor wastes and prevent the migration of the young and energetic to the great cities.

THURSDAY FORENOON.

The committee on resolutions reported Thursday morning as follows:

Resolved, That this convention, embracing the Michigan Political Science Association and the Michigan Farmers' Institutes, return the cordial greeting of the American League for Civic Improvement; and wishing them abundant success in their work, hereby extend to them the right hand of fellowship.

Resolved, That this joint meeting of the Michigan Farmers' Institutes and the Michigan Political Science Association, cordially approves of the idea on which this meeting is based—that of co-operation between all the agencies of rural progress, including the church, the school, and the farmers' organization, and, further, that we welcome any reasonable effort that may be made by any individual or organization, having in view the betterment of rural life. And we especially request the officers of the Agricultural College and Farmers' Institutes and of the Political Science

Association, to take such steps as seem to them wise to perpetuate State and local conferences similar to this one, in which the leading idea shall be to advocate the hearty co-operation of all individuals and organizations that are genuinely interested in rural progress.

Whereas, The attendance at Michigan Farmers' Institutes this year has been the largest for some years, if not in their history; and

Whereas, This is ample evidence of their value in agricultural education;

Resolved, That we express anew our approval of institute work and pledge it our continued support, and recommend its extension through reading and lecture courses.

Resolved, That the thanks of this convention be especially extended to Prof. H. C. Adams of the University, and Prof. C. D. Smith of the Agricultural College for the interesting and profitable program which has been provided for this joint meeting; and that this convention further extend their thanks to the Agricultural College for the cordial welcome given and excellent entertainment provided.

J. H. McDONALD,
J. W. HUTCHINS,
K. L. BUTTERFIELD,
Committee.

Chairman J. D. Towar spoke of Secretary Wilson and Dr. Kedzie as the parents of the beet sugar industry, and asked the audience to rise as a sign of invitation to these gentlemen to take the platform. This announcement was received with much applause and the suggestion was carried out.

SUGAR BEETS.

Preparation of the Soil and Seeding.

BY W. H. GILBERT, LANSING.

First, we must have a good rich soil. It costs but little more to properly till an acre that will give twenty tons of beets than one that will give five tons.

Fitting Sod Ground.—First, plow as deep as you can, from eight to ten inches. Thoroughly roll for the purpose of conserving moisture. Disc it lengthwise of the furrow, then diagonally, and go through it enough times so that the soil is thoroughly pulverized. Follow with a harrow until the soil is in as good condition as it would be for a flower bed. If the ground is clay, follow with the float and then with the seeder. Drill so that the seed will germinate uniformly; otherwise there will be spaces where the seeds do not germinate and you will have either a miss or a late beet. In planting do not put the seed in deeper than ¾ inch, or better ½ inch.

Fitting Stubble.—Plow ten or twelve inches, or even go two or three inches deeper than you have ever plowed the ground before, but do not fail to fully incorporate the new soil with the old. You must do this thoroughly. You do not need to disc unless the soil is very lumpy. Be sure to firm the soil thoroughly; otherwise you get a spreading root and this won't do. Pulverize thoroughly and pack it well, even if it takes ten days. Seed as before.

For Sandy Soil.—Plow deep in the soil the same as before, only roll two or three times so as to pack thoroughly.

Muck.—If you have muck land with clay subsoil, you may need to apply fertilizer in the shape of potash. So far as preparation is concerned, firm the soil well and drag three or four times. You can thus get a good crop on muck.

Use plenty of seed, and do not attempt to fill in vacant places by transplanting.

If you will follow these directions, I think you will make a start for a successful crop. Above all things be thorough.

Thinning and Cultivating.

BY C. T. RICHARDS, ALMA.

In growing beets as in everything else, a good beginning is half the battle. As soon as the beets appear above the ground use the weeder freely. You can do this both before and after thinning. The great advantages of the weeder are in conserving moisture, destroying weeds, and stirring the ground that the cultivator cannot reach.

I use the cultivator twice. Place the scalpers next to the rows as close as possible without tearing the beets.

Thinning.—This process is of the utmost importance. Do not neglect it, as there is a stage in the growth when there is but little development. And you must be careful not to confuse the second leaf with the first. The time to thin is when the fourth leaves first appear on any of the beets, as, if the field is even, the rest of the beets will be in the second leaf. Here comes in the advantage of good preparation of the soil and careful seeding, so that you have uniformity of size in the beets; this makes thinning much easier. Give this thinning your best attention—every day's delay means dollars loss. At this stage of growth the beets can be thinned at a minimum cost, but let the weeds get once well started and choke the beets and you may double and even treble the cost of thinning. I heard a man say last year that he could better thin his beets when they got the size of one's finger, because he could get help cheaper, but of thirty acres he only succeeded in thinning three acres and his crop was a failure.

After thinning you are ready to get out weeds. You can use hoes or not, as you choose, but I certainly would not use hoes for any other purpose than to get out the weeds that are not otherwise reached. It is too expensive.

As to the distance to thin, it is now conceded that nine or ten inches is the proper distance. Last year we thinned to seven or eight inches, but concluded that nine or ten inches is better, as the tonnage is greater in the latter case and the per cent of sugar is the same, while the time of

thinning is lessened materially. We used to thin to six inches, but we have lessened the laborious work of thinning by one-third. In this way one man can sometimes thin an acre in two days. We have had two men thin six acres in five days.

Labor for Thinning.—Some hire by the day and some by the row. We have done both ways. We prefer to hire by the row, for each man gets what he earns. We give six, eight, or ten rows to each person, and when they are finished they are inspected, and if not satisfactory they have to be made so. We get more work done and done better, and I think it is fully as satisfactory to the laborers.

Cultivation.—We use a four-row cultivator but the first three times cultivating it is made into a two-row cultivator, and then when the beets are larger, we use it as a four-row cultivator. All we do in this line during the dry months is to stir the ground lightly to keep out the weeds.

I have sometimes been asked, "How do you reduce the cost of growing beets?" I know of no new methods except thorough preparation, doing the work on time, keeping the weeds out, and giving extensive and thorough cultivation.

Harvesting.

BY I. D. SUYDAM, ST. LOUIS.

My practice is to pull four rows into a windrow, being careful to lay the leaves in the same direction. This is done so that in topping one can grasp the beet just where he wants to, and do the topping with a single motion of the knife and as near the base as possible.

I find it better to work two men together and furnish them two-bushel crates, as these are easier to handle for two men and save half the trips to the pits.

Topping.—We usually work on topping by the row, as it seems to be better than hiring by the day. We usually allow for thirty to forty rows to make a row of piles, at least in growing on a large scale. In small areas instead of using the crates and carrying by hand, I would make a rough sleigh that would carry eight or nine crates. You can use for hauling these a spare horse even if it is good for nothing else. This saves quite a little work.

After the beets are in the pit cover with beet leaves and just before cold weather sets in cover with dirt. If you are putting in the pit for late delivery, the deeper you cover with leaves the nicer the beets will handle; besides if you have plenty of leaves, a very little dirt will keep the beets from freezing. If you do not cover carefully the rain will leak through and it seems to cement the beets; but if you try in the way I have suggested the beets will look on taking them out as fresh as the day when put into the pit.

I have been asked about the racks we use. Our rack is a flat rack in size 6x14x12 feet, the bottom made of 2x8s or 2x10s, and the sides of 2x4s.

Delivery.—I think in the matter of delivery at the factory there is an unintentional injustice to the farmers living near by. The factory gives a preference in delivery to those who ship twenty-five to fifty or perhaps a hundred miles, and this works disadvantageously to nearby growers.

DISCUSSION.

Q. What do you pay for thinning?

Mr. Richards: Twelve and one-half cents per row of forty rods.

Q. What do you pay for topping?

Mr. Suydam: Sixteen cents for forty rod rows. This includes pulling, topping, and pitting. The beets are, of course, first "lifted."

Q. At these rates is the topping better paid than the thinning?

A. No, about the same.

Q. Does that include board?

Mr. Suydam: No, sir.

Q. How do you get the beets into the windrow?

Mr. Suydam: The beets are first lifted, as I have said. Each man takes two rows, pulling with both hands. He raps the beets together to shake off the dirt and lays them all one way. He comes back in the same manner and lays the second two rows the same as the first two. Two men work together.

Q. How far apart are the rows?

Mr. Suydam: Eighteen inches. But I believe the time is coming when we can put the beets in about 16x12 inches and cultivate both ways. I am going to try it anyway, and believe I can get as good or better yield.

Q. How can you plant beets 12x16 inches?

Mr. Suydam: We have got to get the machine men to give us a machine that will do it, just the same as they have given us a machine that will plant corn in distances we want it.

Mr. Voorheis: I met a man this winter who had tried this and had done all work by hand. He only used four pounds of seed per acre, and had boys do the sowing. He saved enough seed to pay the boys. He had no trouble in cultivating, planted 14 inches apart, and had all the tonnage his land would bear.

Mr. Palmer of Lenawee county had experimented with beets four years, and believes in using plenty of seed. The following is his statement of results this year:

Total expense of two and one-half acres of sugar beets.

Use of 2½ acres of land at $3.75 per acre	$9 38	
Plowing and sub. 2½ days at $3.00 per day	7 50	
Harrowing and levelling, one day	3 00	
Drilling, two men and team one-half day	2 25	
Use of drill	50	
Cultivating land twice before thinning, hand cultivator	3 00	
Spacing and thinning, 120 hours at 12½ cents	15 00	
Cultivating ground again, four times by hand	6 00	
Cultivating three times with horse	3 00	
Total expense up to pulling		$49 53
Total expense per acre, pulling, $19.812.		
Expense of topping and harvesting, 16 men 4 days at $1.25 per day	$80 00	
Team plowing out the beets, 2½ days at $1.50 per day	3 75	
Total expense of crop		83 75
Total expense of crop		$133 28
Total expense per acre		$53 315
Expense per bushel (1,300 bushels)		1025
Estimated yield per acre		12 tons.
Per cent of sugar in beets, 16%; proceeds per acre at factory		$64 00
Freight at $1 per ton, $12; 15 pounds seed at 15 cents, $2.25; total		14 25
Net receipts per acre from factory to farmer		$49 75

Q. Are tops better than dirt for covering beets?

Jotham Allen: We put the dirt on first about 2½ to 3 inches, always having a tight pit. Then we put on 5 or 6 inches of leaves which you scatter around on the bottom of the pit before freezing weather comes. When it freezes we use more leaves and more dirt.

Q. What do the experiments at the College in storing beets show?

Prof. Towar: In our experiments we stored six piles with about 800 to 1,000 pounds in each pile. They were harvested October 26, were all weighed, sampled and tested, put in piles in fields, and covered with leaves. Four weeks later they were sampled and tested, and this was repeated four weeks still later. The final result was that, while the beets had lost in weight due to evaporation, they had increased in sugar content. They actually had more sugar in them than at the beginning of the test. The first four weeks showed a shrinkage of 16% in weight and an increase in sugar of 30% with an actual amount of sugar greater by 12% than at the beginning. The second four weeks they shrank both in weight and per cent of sugar. In the whole nine weeks they lost 9.3% of sugar but gained in purity. We, of course, expected an increase in the per cent of sugar caused by the decrease in weight, but we did not look for actual increase in sugar content.

Q. Can we not cover beets with something else than tops and save the tops for food?

Prof. Towar: The tops are best for covering the beets because they do not cling to the beets. Everything else does cling to the beets and is a nuisance at the factory.

Q. Can you silo beet tops?

C. C. Lillie: Yes, I have tried this and the cows eat them up clean. They take the place of corn silage.

Mr. Burgoyne: It has been stated that the farmers like to sell dirt, but that does not pay. You have to pay freight on dirt and that is too expensive. One of the best growers in Saginaw county covers his beets with dirt and has no trouble.

Mr. Bradley: We need to pay some attention to the maturity of our beets. It has been found that there is a difference in the test of 2½ per cent in favor of mature beets. Sometimes where farmers complain of their beets testing low, it will be found that they have had green beets mixed in their lot and some of these green beets got in the test and lowered the value of the entire load. Something has been said here today as to the soil. It will be found that the best beets in our country are grown on hard or at least heavy clay, the beets testing as high as 17 per cent.

Q. Can pulp be kept in the silo?

C. C. Lillie: There is no question but pulp will keep perfectly in the silo. Put it in as fast as it can be brought from the factory.

Q. Will beet tops taint the milk?

C. C. Lillie: We fed beets once a day at night, and had no complaint. Be sure not to feed too much at once. You can taint milk with corn, clover or silage if you feed too much at once.

Q. Was not the shrinkage of the beets in the College experiment too great? If we got as much shrinkage in potatoes we would think it a pretty serious matter.

Prof. Towar: Beets dry out much faster than potatoes do; besides a good deal of dirt was shaken off also during the experiments.

Q. How can beets actually gain in sugar?

Dr. Kedzie: It is hard to say. The materials that make sugar come from the air through the leaves. As the beet ripens, the sugar content increases. Besides there is also stored up a sort of gummy substance. It is the presence of this that affects the purity. Out of this gummy substance the sugar is developed and it is possible that this process goes on for a brief period after the beets are stored.

Secy. Wilson was asked to make a few remarks on the subject of sugar beets. He said: "I am satisfied that the future of the beet sugar industry depends upon good farming much more than it does upon any political action that may be taken.

"I speak of this sugar beet business from experience in growing. I note that the question of feeding beet tops has been mentioned. I do not believe you can feed tops and get good milk. You can feed the beet itself and you can feed the pulp, but the tops contain salts that are needed in the land, and should be plowed under for the benefit of the soil, but should not be fed.

"The question is sometimes asked, may we grow two beet crops in succession on the same soil? I answer yes, of you furnish to the soil the fertilizer that was taken out by the first crop; but a safer way is by proper rotation. Those who rotate crops and grow grass get humus into their soil, but the growing of hoed crops in succession

such as corn or beets leaves the soil in bad shape to resist drouth. To resist drouth you need, first, plenty of plant roots in the soil, and, second, frequent cultivation. It has been demonstrated that if we conserve all the moisture perfectly in the soil, six inches of rainfall would be sufficient to grow the average crop.

"Let me say again that the great future of sugar beet growing lies in correct farming. We need to grow more than 12 to 15 tons per acre. I got 20 tons per acre six years in succession in Iowa. Remember that good corn land is good beet land.

"Another important thing is to make good use of the by-products. After the sugar is taken out of the beet nearly all of the substance that the animal really needs is still left in the pulp, so your best business in Michigan is that of selling air in the form of butter and beet sugar. You will have cleaner and richer farms because you have sold a manufactured product instead of the raw material. Now this question of beet pulp. I talked with Claus Spreckles last year who feeds pulp daily to 600 dairy cows. I asked him if it paid him. He said pulp was the most profitable food he had ever fed his dairy cows. We must, however, find a way by which to press the water out of the pulp. It has been tried in California and is not expensive.

C. C. Lillie: Why does Sec. Wilson advocate not feeding the beet tops? Of course we need these elements returned to the soil. That is true of any crop, but is not a crop better for feed first? We have to pay freight on the pulp. Why can't we save a little by feeding all the tops?

Secy. Wilson: I do not believe that you can get good milk or good butter or good cheese if you feed beet tops to dairy cows. They are almost sure to taint the product.

C. C. Lillie: It has not been my experience.

A resolution was introduced by Jotham Allen, and after slight amendments, was passed as follows:

Lansing, Mich., Feb. 27, 1902.

We, representative agriculturists at the meeting of the Michigan Farmers' Round-up Institute, do sincerely believe that the lowering of the duty at the present time on sugars would be a lamentable, serious and possibly death blow to our sugar beet industry; therefore be it

Resolved, That we earnestly entreat and implore our President and Congress to stand by and protect the tillers of the United States soil by retaining the present duty on sugars, thereby giving to our farmers and laborers one of the most profitable branches of agriculture we have ever had the privilege of enjoying.

THURSDAY AFTERNOON.

T. G. Adams, president of the Allegan County Institute Society, in the chair.

President Adams described the methods in vogue in Allegan county in the conduct of institute work. There had been held this year 49 separate institutes, in all 147 sessions. In the last four years forty thousand people had been reached, with a membership in the institute society of over fifteen hundred. A report is issued annually which gives a stenographic report of the principal papers and discussions at the several sessions. Allegan county is fully alive to the benefits of institute work, and the late census shows that it is progressing as fast as any other county in the State, if, indeed, its farmers are not progressing faster than those of any other section.

The topic for the afternoon was "The Factors Entering into the Profitable Production of Meat in Michigan in Competition with the Corn Belt."

The discussion was led by Mr. J. J. Ferguson, of the Agricultural College, his subject being "The Kind and Quality of Stock to Raise for Purposes of Beef production."

Mr. Ferguson said, in substance:

Having recently been called upon to go over certain classes of cattle in the show ring at the Charleston Exposition and, in addition, having made an extended visit to the International Stock Show at Chicago, I have had a good opportunity of comparing Michigan with other States as to resources and as to live stock.

This State is one of varied resources. In the southern part we have the corn belt proper, while in the northern part of this peninsula, and in the whole of the Upper Peninsula, we have conditions differing widely from those existing in the southern tier. It is necessary, therefore, to adapt ourselves to widely varying demands and to think of our live stock accordingly.

The past season has been one of abnormally high prices for good, first class, well fattened beef animals the top price has reached, or gone past, seven cents, while the average price has been up to, or exceeded, five cents. There has been no time in the last twenty-five years when the top prices for all grades of beef animals has been better than last month. Swine are sold higher today than at any time in the last thirteen years. So fattened lambs are selling away above prices realized for several years.

These facts justify us in calling attention to the time as one peculiarly auspicious for developing fattening stock. When we come to consider pure breeds we have, again, to record nearly, if not quite, the highest prices on record. Five and six thousand dollars for a single bull have been reached and even seven thousand five hundred dollars for the Shorthorn, Choice Goods. The question arises as to whether the farmers should raise full bloods. My answer would be not unless he has naturally an instinct in that direction which he has had opportunity to cultivate. To succeed in raising pure bloods a man must be able to know by intuition variations in form and expression which are totally masked to the ordinary man. Better leave the raising of pure bloods to the few who are willing to take the risk incident to the business and who, perhaps, do not depend upon the precarious profits from this business for the support of a family. The average Michigan farmer will in nine cases out of ten make vastly more money in breeding and feeding animals for the block, using the pure bloods as sires, than he will make from the raising of the pure bloods themselves.

The southern tier, or possibly three tiers, are the beef and mutton counties of the State. Here corn grows to perfection, and where corn grows best we have the best locality for the production of meat. The dairy, on the other hand, may do as well in sections where corn is not at its best. We should expect, then, in the southern counties a greater tendency toward beef and mutton than we should find farther north.

On a recent visit to Minnesota I listened to a very lively discussion as to the merits of the so called dual purpose cow. In this discussion Prof. Thomas Shaw took an active part, urging the claims of this class of animal. This discussion has been going on for ten years, and yet we have no fixed type for dual purpose animals. It is true that in the case of both our straight bred beef and dairy breeds a certain definite type is at

the present time more or less clearly defined. We are open to conviction in this as in other matters, but must confess that we do not believe the dual purpose breeds or grades of the same to be universally suited to the needs of this State. Those men in those sections of the south already referred to, care but little about the dairy business. Up in the north we have found that beef raising is over-shadowed by dairying, so that each particular section has its own specific needs.

We shall leave it to those men following who represent different sections, to discuss their own conditions, but there are a few things which we might say in a general way, which are equally applicable to every stock growing county of the State.

The great beef growing sections of the corn belt and of the far west, have gone directly to the foundation of success, they have wasted no time in experimenting with middle purpose breeds, but have spent their money lavishly in buying the very best beef sires to be had among the herds of the east. We find this condition of affairs is a thing of the past. At the last International Exposition steers graded from the old native Texan by the use of pure bred Hereford sires, were able to meet in competition and to defeat some of the best products of the feed lots of the middle west. Therefore we cannot claim as in the past that the beef of Michigan goes to supply a superior trade. The packers tell us that much of the beef coming to Chicago, is range bred and range fed, and further it is an actual fact that when our State Experiment Station desires high grade steers in any numbers for feeding experiments, they must go to Chicago and buy these western steers. So, we frankly admit that the tide has turned and that today we must compete on the same level with the feed lots of the corn belt and the cheap grass of the range country. We can scarcely hope to produce beef as cheaply as they can in the west, consequently we must look to it that there is a decided improvement in the beef quality of the steers we send forward. Breed and feed must always continue to be perhaps equally important factors in this improvement, one is of little use unless seconded by the other.

As to breed, a man can make no mistake in selecting high grade or pure bred Shorthorn, Hereford, or Aberdeen Angus sires for grading up purpose. We believe there is no place for Galloways or Devons in competition with these breeds, but when a man has once made a selection we cannot see any possible advantage from using in turn sires of the different breeds mentioned. Uniformity is a prime essential if one expects market topping prices. Uniformity never can be secured by following up this mixing process. Select your breed, purchase the best sires your means will permit, stick continuously to it, and in the course of a very few years you will have a class of animals which, to all intents and purposes, are pure breds.

The second great essential is proper feed. Along this line we have to distinguish very carefully between those feeds which are suitable for the laying on of flesh and fat and those which give a maximum production of dairy product. This question of feed can best be handled by those men who are to follow dealing with different localities and the methods which they have found both successful in their own practice.

The Silo for Lambs and Steers.

BY A. M. WELCH, IONIA.

I think naturally that my topic is one of the most interesting on the program. I shall give no theories but simply tell my own experience. It is now thirteen years since I built my first silo, and I grow more enthusiastic about silo every year. When I first started I was laughed at for going into the silo business, but I am glad to say that nearly every prominent stock farmer in my county is using from one to three silos. In Ionia county the dairymen and feeders of sheep and cattle are building silos; and when I remind you that Ionia county is far more a feeding county than a dairy county, and further tell you that thirty silos were completed in one township last year, you will see how our stock farmers are coming to feel about the place of the silo in feeding lambs and steers.

I will say a word about the gains I made last winter. I fed a ration 1¾ pounds of corn silage, and ¼ pound of culled beans. This we feed morning and night. For a noon feed I used hay one day, corn fodder the next, wheat straw the next, oat straw the next, and then repeated. Just now I am also feeding a little corn and cob meal.

I bought 1,000 lambs last November. They were put into the barn December 8. The whole lot when weighed in averaged 56 pounds. I fed eleven weeks and the 1,000 lambs weighed out 77 pounds, or a gain of 21 pounds in 11 weeks. They were dipped during the cold weather. Three hundred of these lambs which were considered the tops and which weighed in 63 pounds. I expect to turn off a little earlier. This bunch of 300 weigh 80 pounds today.

Now as to sales. I have fed western lambs every year but one. For instance, in 1899 I bought Montana lambs which weighed in at 58 pounds and were sold June 2, in Buffalo at 92 pounds. There were three double decks of these lambs, they brought the top of the market, $6.75, and not one out. A year ago my lambs weighed in in November 45 pounds, they sheared five pounds of wool, and on May 30 they weighed 85⅓ pounds and brought $5.75, the top of the market. Thirteen head of these weighed 122 pounds and brought $5.25. Two years ago I figured that the lambs gained practically two pounds a week and made me practically six cents a head per week. I feed silage and a light grain ration.

As to cattle. I agree that the best food for a steer is fine succulent pasture, but I claim that the next best is silage and particularly because it is succulent. One of our feeders feeds cattle annually and gets gains of nearly three pounds a day. In fact his gain more than pays for his ration. He feeds 8 pounds of corn, 25 pounds of silage, and 4 pounds of hay. Another neighbor with a bunch of 18 steers made them gain over three pounds a day. He fed silage and a light grain ration.

THE SIMPLEST METHOD OF HANDLING THE CORN CROP.

HON. L. W. WATKINS.

Professor Smith certainly paid me a very great compliment, when he assigned me this subject, in assuming my knowledge of the simplest method of handling the corn crop. A knowledge however to which I lay no claim. My friend Welch, whose hobby is also corn, handles the crop in an entirely different way upon his farm than do we upon ours, and his enthusiasm, his business economy and his grand results accomplished as a feeder and dairyman have served as an inspiration not only to you and to me but to the agriculture of our northern states. It is very likely indeed that to him and to scores of others here today, could have been assigned with far greater propriety the discussion of this subject than to me.

And yet in our humble, simple way, in a section of the State where there is no certainty of obtaining extra help on the farm when needed to handle this heaviest and most valuable of all farm crops, which must be secured from the possible ravages of frost all within a few days when cutting time comes, we may perhaps claim some of the originality in what we consider a well-systematized and effective though possibly a somewhat crude method of handling our corn.

Our plan is to use just as little high-priced labor to accomplish the profitable result as is possible under existing conditions which we have endeavored to make most simple and effective. Make every separate, individual move count two if you can.

According to the maxim that the living need charity more than the dead, apply all the force of your own energy to the growing crop and make it as a living thing most comfortable and luxuriant unto its death. Then insist that all your live stock, in due respect, attend and take part in the obsequies to follow after the grim corn reaper has done his ruthless work, and make of each animal the most elaborate, the highest-priced encasing casket, as you store away therein the remains of your honored dead—the grain and fodder and tasselled green—*King Corn.* These last sad rites should be simple and every move toward interment effective, the handling final. But the good of the dead shall remain after them.

For corn we plow sod ground with just as much manure on it as we can well plow under. We plow just as shallow as possible and still have a dirt mulch above the up-turned grass roots. We roll down the furrows and harrow and harrow and drag and drag not just until this seed bed suits us but as long as we dare before planting, usually nearly till the first of June. We prefer to cultivate our corn as much as possible before it is planted and if this is done it will grow and mature just about as early as the first planted fields in poorer state of cultivation. I make this point because among the general or mixed farmers, who put in other spring crops than corn, the seed bed for the latter crop is usually fitted very poorly, dependence being placed largely upon the future cultivation of the planted crop to get air into the soil, to make available the inert plant food of the soil, and to conserve its capillary moisture.

Our corn is all planted with a two-row planter set to drop one or two kernels every ten or twenty inches, varying according to the size of the variety, in rows three feet eight inches apart. The subsequent slight thinning by the weeders and drags makes the stand about perfect, being practically the same number of stalks per rod as when planted in hills by hand but distributed over the length of the row giving the individual stalks more root and leaf space and consequently more strength. About a three row space on each end of the field should be sowed both ways to turn on when cultivating the length of the rows with the two-horse cultivators and it is better if these end rows are planted to beans or potatoes or roots. We like to put in some early variety first and last thus extending the harvest and planting season over considerably more time.

Now, with our corn in the ground, we continue our dragging with spike-tooth drags and weeders, keeping the latter going until the corn is several inches high, alternating with two-horse cultivators the way of the rows. We go over the fields just as many times as is possible until the corn is tasselled out and the ears setting, making the cultivators work shallower and wider from the rows as the season advances and the roots stretch out and up.

We have more than one reason for our particular care of the corn ground and I may state that on our farm we have just two main crops—corn and clover. The corn crop is the only crop for which we plow. When we plow for corn we are plowing also for our wheat and oats and barley which are grown always as side or catch crops after corn, the wheat being drilled in the standing corn or stubble after cutting without any special preparation of the mellow soil and the oats after the stubble ground is loosened with the disc in spring. We plow for corn only when a field has past its best as a pasture or has become what is termed turf-bound, and always seed our wheat or oats with clover and all of our corn ground is sowed to some one of these crops which serve as a nurse-crop to the clover.

Our regular rotation is corn, wheat or oats, clover, pasture, corn. When we plow for corn, as I have said, we are plowing for our wheat and when we cultivate our corn we are dragging our fallow and putting it in the best possible condition for the wheat and the clover seeding to follow. In this way all our wheat crop costs us is the price of seed plus the expense of harvesting and threshing and we have had no delay in getting our land seeded to clover again. We use corn for our breaking-up crop on sod and coarse manure and make it serve a manifold purpose in the farm economy.

When corn harvest comes we hurry. All is cut with harvesters, going in long bouts the length of the rows across the forty-acre fields. Three or four men set up after a machine and carry the bundles, which are made as large as possible and already laid in rows, to the center—six bundles wide from each side and making into great shocks of two dozen bundles each. These shocks are set up compactly as broad-topped wigwams—a fitting method in handling the Indian's own grain crop—and are finished by bringing the tops forcibly to a small point with a patent shock-compressor, when they are tied with twine each being in itself a perfectly shaped little stack nearly if not quite air and water tight at the top.

When the fields are all cut wagons drive between the rows of shocks and the scattered, fallen ears are picked up and hauled to the feed-lots for the stock on grass. This completes our field operations.

Now as to feeding. We feed all of our cattle, many of our horses not in use in winter, all of our breeding ewes until near lambing time and part of our feeding sheep nothing in the grain line but shock corn—and by shock corn I mean the whole corn plant as cut and thrown out from the corn binder in bundles. This corn is in most cases drawn from the fields—enough to last about a week at a time—direct to the feed yards and roughly stacked from the wagon by the hauler in small piles just outside to be fed out as required. That for the stock wintered in open sheds in the fields is hauled direct to the feed racks or if the ground is frozen is distributed on the hillsides each day where it is eaten by the stock and the manure distributed where most needed. We keep most of our young stock in what we call "ranches" situated in the farthest fields because we want to save the hauling of the feed to our home barns from these far-off fields and the return hauling of the manure in spring. Only enough corn is stacked in the fall to make it unnecessary to send teams to the field in bad weather. It is simply a reserve supply.

For sheep and cattle we would never husk corn, for lamb feeding we would feed ear corn though we prefer husked ears to that in the shock for lambs, they seeming not to handle the rough husks well. We do, as a matter of fact, feed much shelled corn to lambs—I am going to be perfectly honest with you—principally because our combination hay and grain racks in our main feeding basement were specially made for shelled corn. We endeavor, however, to simplify this shelling along with the other corn-handling operations. There are no shellers or grinders on our farm other than the stock in the yards. Such shelled corn as we use is prepared in this way: A hard-wood floor 100 feet long and 12 feet wide is filled by dump cart from our temporary cribs in which our ear corn is stored direct from the husker. It holds about 500 bushels of ears and when the flooring is on a sharp shod team is exercised upon it going back and forth until the ears are broken and shelled into a loose mass of pieces of cobs and shelled corn. A fanning mill is placed at one end of this floor and the whole bulk run through as needed—the perfectly cleaned shelled corn being shoveled to the spouts which convey it to the feeding basement below while the broken cobs with a few kernels left upon them are placed before the stock to be picked over at their pleasure. We can shell the 500 bushels in half a day with one team and the work is splendid exercise for the horses when bad weather forbids outside work. This is the simplest, most reliable method of shelling corn of which I am aware. My friends sometimes ask, why don't you get a gasoline engine or a wind power mill and have a sheller and grinder? My answer is, I cannot afford to do so.

We offer no objections to the methods of those who may differ from us in handling the corn crop. In fact we are looking for a simpler method still to carry out the details of our work. Our method makes little excitement or show, costs little and makes us money. It suits our conditions and fattens stock economically and well. I might say that we are in about the position of the country laborer compared with the laborer in the city who gets much more money perhaps—handles more

it may be, has much excitement not shared by him on the farm but saving far less in the end.

There is from 15% to 25% of waste in the handling of shock corn according to the authorities but Henry, in his book "Feeds and Feeding" which every one of you should not only read but own and should keep on the same shelf with your Bible and dictionary, puts it practically the same. It is undeniably a fact that nothing is found more palatable to stock than these original bundle parcels of Nature's own balanced ration, the stalk with its own grain, and the ears cannot be taken without the fodder being consumed with it and they are sweet and untainted by vermin and handling.

Again, while it is a fact that whole kernels of corn do pass undigested from the animal, Henry again says that there is no more undigested nutritious matter lost in this way from ear corn than from cornmeal. And there is no other way of feeding in which you can grow and fatten a crop of hogs along with your feeding so well as this. It gives them a chance to save and utilize the waste which is in this case whole kernels of corn which, mixed with the ground fodder, etc., is of necessity a nearly perfect ration. In feeding other rations the waste is not usually available for other purposes than for fertilizers. We know that valuable, undigested nutritious matter does pass off however though unnoticed by us.

I am sorry on your account that my subject does not bring out any interesting new scientific theory or practice. Nothing exciting or out of the ordinary. It has simply been my privilege to speak to you of common, practical things, simply and quickly and economically done.

DISCUSSION.

Q. Mr. Welch, what do you figure your net profit on sheep?

Mr. Welch: This varies, of course, with price, but I figure that it costs $1.50 a head for feed and labor and that I can on the average net about $1.62 a head. By the way, I want to hear from Mr. Bale of our county. He has had some experience in that line.

Mr. Bale: Last winter we fed two car loads of lambs which Mr. Welch bought for us. We were not in shape to handle them in the barns when they came and they shrank in weight a little on account of the storms. We began to feed them light, feeding roots, bean pods and shredded fodder. During the last six or eight weeks of the feeding, and as a test, we took out 50 lambs for quick fattening. We fed them the following ration: 16 pounds cob meal, 20 pound bran, 14 pounds beans, 120 pounds ensilage and 30 pounds hay. Figuring the silage at $2.50 a ton and the hay at $5.00 a ton, this ration cost us 69 cents a day. They gained one-third of a pound a day and a little better. Assuming that this record had been carried out for 90 days' feeding, this bunch of lambs made us more money than any other stock we have ever fed.

Q. How do you prepare silage?

Mr. Welch: Put only mature corn into the silage, especially if you are going to feed for fattening. I want to say, too, that we used to feed shocked corn and handle it just as Mr. Watkins does, but we believe we have improved on that plan. Moreover, nobody husks corn. We grind corn and cob. Before, we used to feed the corn and stalks indoors. We held that to feed out of doors meant that we had to keep up more animal heat and we did not think we could afford to warm the canopy of heaven.

Q. Why feed corn and cob meal to lambs?

Mr. Welch: It lightens the ration. I understand the cob is as good as timothy.

Q. At what age do you turn off the lambs?

Mr. Welch: I usually ship in May. This would make them about a year old.

Mr. Watkins: I do not believe that there is really any friction between the shocked corn feeders and the silage feeders. I will admit that there are grand results from

silage, but it is not the only feed. We are not studying to do up the silo men, but in our way we get good results. We have studied the thing out and we know we make it pay.

Q. In filling the silo do you put in the entire plant?

Mr. Welch: Yes.

Mr. Watkins: It occurs to me, Mr. Welch, that it makes pretty expensive feeding when you put the entire corn crop into the silo, and then feed the cattle that and also add hay and grain. We feed this same corn crop, but instead of feeding the nicest hay and grain, we add roughage.

Mr. Welch: Yes, but you must remember that I get 20 tons of corn fodder to the acre while you only get 6 tons; besides my stock has green feed and yours has dry feed. Forty pounds of silage a day means only three pounds of grain. You have got to feed a balanced ration, and that is why we add the other grain. I do not believe that when you feed corn fodder the stock gets all of the grain or anywhere near all of it. I have seen steers many a time trying to master an ear of corn, and while they did a good job of shelling it, half of it ran out onto the ground instead of down their throats.

Mr. Watkins: We raise two kinds of corn, the Hathaway Dent for the large and the Longfellow Flint for the small. We plant the latter close and get small ears purposely for the smaller animals.

Mr. Welch: I cannot afford to raise small corn. This is the kind of corn we raise in Ionia county. (Showing a bunch of nice plump corn.)

Mr. Watkins. Do your cattle eat up the fodder clean?

Mr. Welch: No, they won't eat the butts of the stalks. I know that in silage they do it, but it is because they are compelled to, not because they want to. They do the same thing with shredded fodder if it is fine enough. After the cattle we let the sheep have access to the racks and then the hogs follow.

Q. What gains do you get?

Mr. Watkins: We have gains all the way from 1¾ to 4¼ pounds a day.

Mr. Raven: I do not believe the cattle eat the coarse part of the stalks merely because they have to. When my cattle are given silage, they eat the ears first then the joint, and the leaves last of all.

Mr. Watkins: My observation does not agree with Mr. Raven's.

Mr. Raven: Well, I don't want any man to go away from this meeting hanging to the old notion that good silage is not good food. It is sweet and good and the cattle eat it because they like it.

Mr. Welch: I always put corn into the silo when the ear is just matured but the stalk is still green and digestible. It is all good, every bit of it, and the cattle eat it greedily. Now let me ask some of these fodder men how much green fodder a cow will eat when she has had all the silage she wants.

Mr. A. B. Cook: I would like to ask Mr. Welch how much water a man can drink after he has had all the whiskey he wants.

Mr. Welch: I do not know. I am not an authority. Mr. Cook will have to answer it himself.

Q. Mr. Watkins, do your cattle consume as much green fodder April 1 as they do December 1, and what percentage more waste is there at the latter date?

Mr. Watkins: There is no more waste.

Mr. Bale: That is not my experience. My observation is that they won't eat as much in March as they did in earlier winter. Either the fodder is not as good as it was earlier in the winter or they get tired of it; but it doesn't seem to be this way with silage.

Mr. Watkins: In warm weather we sprinkle with salt for appetite's sake.

Q. Is not 120 to 125 bushels of corn per acre too much to put in the silo for dairy cows?

Mr. Welch: I would rather take off 50 bushels where the yield is that large. I grow cane and cow peas and put them in the silo with the corn. This gives me nearly a balanced ration in my silo. I have corn husking 165 bushels to the acre. I cannot afford to plant small corn. I plant the rows standard width and 10 to 12 inches apart in the row. I can haul corn to the silo as cheap as a man can shock it.

Q. Do you think farms are worth more with you than they were before the silo came?

Mr. Welch: Yes, sir.

Mr. E. E. Owen: I bought a farm a few years ago on which is a silo, but I never fill the silo except with shredded fodder. I believe I am making three times as much money

as the man who had it before me. The silo only lasts about ten years anyway. Farmers ought to think of this point.

Mr. Welch: My first silo is about 13 years old and just as good as ever.

Mr. Gilbert: In 1880 I built three square stone silos. They are as good today as ever. I commenced to make money with dairy cows the day I began to feed silage. I have seen cows take ensilage before they would their grain.

Mr. Geo. A. True: I am sure cows can distinguish between different parts of the corn, but their tastes vary. I have heifers that will pick out the leaves and stalks before the corn. Others do the opposite. There is no doubt they know what they are doing. If they eat silage clean, it is because they like it.

Mr. ———: It looks to me as the opponents of silos are those who have not had experience with them.

Mr. A. B. Cook: I have a good silo on my farm and used it several years, but I have discarded it entirely. My specialty is lamb feeding and I can do better with a system much like that of Mr. Watkins.

John Hull: I disagree with Mr. Welch at one point. I would put in all of the corn for ensilage, even if yielding 125 bushels. If I had a yield of corn of 200 bushels to the acre, I would put every bit of it in the silo. Peas are all right enough, however; we feed no grain except bran.

Mr. Bale: We build a cheap silo which is a round hoop silo built with hemlock. After a few years' use it is still perfectly sound and I see no reason why it should not last 100 years. The cost of the silo is really trivial. But I do not believe in fancy silos.

A. B. Cook: I believe that in 10 years from now corn that will husk 125 bushels of good corn will be kept out of the silo. Of course the nicest way to care for the stalks is in the silo, but if the farmer is near a beet sugar factory, he can get pulp at fifty cents a ton. This will go into the silo and the corn will be kept out of it. The lamb feeders will use finely shredded fodder, will husk corn and feed the lambs corn on the ear. We need succulent food but the pulp will give it.

Q. Is there any loss of sugar in the silo by fermentation?

Mr. Welch: No, sir. Now about this pulp. Pulp is all right. I had two car loads and put it in the silo. But let me give you my figures one year on the cost of silage. It has been quoted here at $2.50 a ton. I can as a rule grow 20 tons to the acre, but the year I speak of I grew 30 tons to the acre, and my figures show that I grew the corn and put it into the silo for sixty-eight cents a ton.

Mrs. H. H. Hinds: We used to fill silos, but now we follow Mr. Watkin's plan.

Mr. Watkins: The silo may be all right for the dairy business, but we are not in that business. For steer feeding we like our way best. We do not use clover hay because steers won't eat it; so they must be pretty well suited with the fodder. I notice too that the best beef in the United Sates is made on shocked corn in the corn belt. I will admit that we may not make as startling gains as some of the gentlemen have suggested, and we do not have as much work or handle as much money. But I think our way is cheaper and that we make just as much money from our steers as the silo men do.

Q. Does Mr. Watkins know how much it costs him to make a pound of beef?

Mr. Watkins: No, sir, and I do not think the silo men do either.

Prof. Smith here gave results of winter experiments in feeding steers.

Prof. Smith closed the discussion with the following remarks: We can say three things about this subject that are true and established. (1) The silo is essential to the dairyman. (2) For lamb feeding probably the silo is an important factor in reducing the cost of a pound of lamb. (3) Indications are from experiments that through the silo you can handle corn as cheaply for beef as in any other way, but it may not be the most economical in the end. Under high labor cost at silo filling time it may be true that shocking is cheaper.

THURSDAY EVENING.

Hon. C. J. Monroe in the chair.

THE REJUVENATION OF OLD APPLE ORCHARDS.

PROF. L. R. TAFT, M. A. C.

The word "rejuvenation," as it appears in the title of my paper, was not of my selection, and if any of you expect me to tell how to make young again, the old and neglected apple orchards of Michigan, I wish at once to disabuse your minds of this idea. What I hope to do is to offer a few suggestions upon how the apple orchards of 25, 30 and even 40 years of age can be brought into the best condition.

A few years ago, a favorite discussion for platform discussion was, "What shall we do with our daughters?" and if you will allow me to paraphrase it, I will take as my text tonight, "What shall we do with our orchards?"

Twenty and thirty years ago, the orchards of southern Michigan were famed for the regular and abundant crops they produced, as well as for the size, high color and good quality of their fruit. At that time, most of the trees were from fifteen to twenty-five years of age and, as they were planted on new land, the soil was still well supplied with humus and plant food. The insects had not become very troublesome, canker-worms were unknown, and the curculio was seldom seen, while the codling moth was not greatly feared. As the trees grew older, their fruitfulness decreased. Three years out of four the crop has hardly been worth gathering and, in the years of plenty, most of it is small in size, rough, cracked and misshapen, from the attack of apple scab and curculio, and is generally inhabited by one or more apple worms. The leaves have become small in size and yellow in color, with ragged edges, and most of them drop from the trees weeks and even months before the normal time. The tree tops have become filled with dead branches, and when these are cut off the trees become mere skeletons. In many cases the trunks have become hollow and the weakened branches break down in windstorms.

Most of these old orchards have been in sod for many years and have either been used as pastures or meadows. They have had no care except the cutting of the grass and the removal of the dead branches. The trees have suffered from drouth, the humus and plant food have become exhausted from the soil, and canker-worms and apple scab have played havoc with the foliage. One trouble, that is not understood by the average grower, is the apple canker or anthracnose. This is a fungous disease, similar to the black-rot of the fruit, which destroys large patches of bark on the trunk and branches, thus, in a measure, girdling them and permitting the wood to dry out. The twigs on the branches thus affected make but a short growth and, if the injured area is a large one, the

portion above soon dies. In many orchards where the branches are dying a careful examination will show that the trouble is due to this disease.

The failure with our apple orchards has sometimes been ascribed to changes in the climate, but these changes have been comparatively slight. It is true, however, that the injury is to some extent due to the changes that have taken place in the conditions, other than those of climate, under which the trees are growing, as compared with those under which the trees first planted in Michigan existed. In the early days the virgin soil was full of humus which held the water like a sponge, but it is now exhausted and the trees suffer from drought, the trunks and branches become sun-scalded and fungi attack the leaves. The forests having been cut away, the winds have a full sweep, and during the winter the snow that falls is blown away, leaving the ground bare in the orchards. In their weakened condition, the trees may be seriously injured or even killed by a severe winter. As the result of all these unfavorable circumstances, and the consequent small and inferior crops, many owners of orchards have come to the conclusion that the trees are not worth the ground they occupy and have cut them down. This step is in exact accord with the advice given by Geo. T. Powell at the Pontiac Round-up in 1898, where he stated, in speaking on "The Planting of Apple Orchards," that "the first thing to do is to uproot and destroy all of the old apple orchards." While this is excellent advice in many cases, in the opinion of the writer, many and perhaps a majority of the orchards in southern Michigan, even though they cannot be rejuvenated, will at least well repay the trouble and expense of their renovation, or the attempt to bring them into the best possible condition for fruit bearing.

The destruction of the old orchards has been most common in the more southern tiers of counties, and as we go north, where the country was settled later, the orchards being younger are giving better returns. In most of the southern counties the area that has been planted to apple orchards during the last twenty years has been small, being but a fraction of what has been cut down. In the more northern counties the planting has been much larger and, as most of the first-planted orchards are in good condition, few have fallen before the ax, and the acreage has made a considerable increase.

That the acreage in apple orchards in southern Michigan has decreased during the past twenty years is shown by the following figures, obtained by the supervisors and reported to the Secretary of State. Most of us were aware that the acreage had decreased but, for myself, I must express surprise at the extent.

Apple Orchards in Southern Michigan.

Counties.	Acreage in 1880.	Acreage in 1900.	
Monroe	7,284	2,785	
Lenawee	10,541	5,880	
Hillsdale	9,510	4,772	
Branch	7,238	4,148	
St. Joseph	4,978	2,483	
Cass	5,798	3,153	
Berrien	10,871	7,510	
Total	56,220	30,731	Loss 46 per cent.
Wayne	5,836	4,336	
Washtenaw	9,227	5,098	
Jackson	8,131	4,177	
Calhoun	6,713	4,129	
Kalamazoo	6,298	2,645	
Van Buren	7,916	6,075	
Total	44,121	26,460	Loss 40 per cent.
Macomb	5,665	4,316	
Oakland	11,021	8,368	
Livingston	6,544	4,040	
Ingham	6,282	5,375	
Eaton	6,821	5,681	
Barry	5,009	4,365	
Allegan	7,690	6,983	
Total	49,042	39,128	Loss 20 per cent.

It will be noticed that, although there were hundreds of thousands of trees planted during the twenty years between 1880 and 1900, there was a decrease in the acreage of apple orchards in the southern tier of counties of 46 per cent; the second tier of counties shows a loss of but 40 per cent. As we go farther north, where the country was opened up at a later date and the orchards are younger, the decrease is less. In the third tier of counties the loss is but 20 per cent. In the counties yet farther north the planting is still going on rapidly. Thus while Newaygo county had but 1,587 acres in 1880, the acreage had increased by 1900 to 2,174, or about the same per cent of gain as was the loss in the southern counties.

The yield of the orchards at the above periods cannot be stated definitely, owing to a change in the method of reporting the crop, the *amount sold* being formerly given while now the *total crop* is reported. Allowance must also be made for the difference in yield from year to year, but to show in a general way that there has been a considerable reduction in the yield of the orchards of southern Michigan, it may be stated that in 1880 the number of bushels *marketed* in Hillsdale county, after providing for home consumption, was 265,000, while for the three years previous to 1900 the *entire crop* averaged but 86,000. The same loss is found in Lenawee county where the corresponding figures are 305,000 and 113,000. After making allowance for the amount required for home

consumption, it is probable that the figures showing the yield for 1900 would be but about one-quarter those for 1880. The same condition prevails in nearly all of the southern counties.

From this it is very evident that on an average the orchards of this portion of Michigan have not paid for the ground they occupy and, rather than allow them to remain in their present unfruitful condition, it would be better to follow the advice of Mr. Powell and convert them into firewood.

On many farms we find only a few apple trees, designed to furnish fruit for family use. Oftentimes they are near the house where the land would not be used for farm crops, and where they furnish shade and at the same time relieve the otherwise barren landscape. Under these circumstances their removal would not be desirable, especially as with a small amount of labor they may often be brought back to fruitfulness. It is the orchard of five to ten or more acres that presents the more difficult problem, as we must first decide whether they are likely to repay for the labor of renovation and for the use of the land they occupy. To be able to secure satisfactory returns the trees must be in a fairly healthy condition, and the soil and location must be adapted to apple growing.

If a large proportion of the trees are missing, and especially if those that remain have hollow or otherwise injured trunks, if a part of the branches have broken down and the others are in a weak condition, the chances are decidedly against successful renovation. Many orchards have not been fruitful, and cannot be made fruitful, owing to their being located on low and poorly drained land, and the sooner they are removed the better. The nature of the soil should also be considered and either extreme of sand or clay should be avoided. On a light sandy soil the trees are likely to suffer from drought and from a lack of plant food, while a clay soil is difficult to work and the surface bakes, and it may become even drier than a sandy soil during a long drought. In a general way it may be said that a strong loamy soil, either a heavy sandy loam or a light clay loam soil, will generally be adapted to apple culture, and if it is so located that it has good drainage for both air and water and the trees are in a fairly healthy condition and of good varieties, it will generally pay to renovate them.

TREATMENT OF THE TREES.

In the renovation of old orchards, while a marked benefit can generally be secured if the treatment includes but one or two of the four lines of work that will be recommended, the best results cannot be obtained unless attention is given to all of them. The causes that have been at the bottom of the trouble have been stated and the treatment will be along lines calculated to correct the difficulty. The four things that are needed by most of our apple orchards are, (1) pruning, (2) cultivation, (3) manuring, and (4) spraying.

PRUNING.

The pruning needed varies with the individual trees and only general rules can be given. It will always be well to cut out the dead branches, and

if the tops are too thick, the branches that cross or run parallel and close together should be taken out. Many orchards have been pruned to death and in others, as a result of over or improper pruning, we find long, bare branches with tufts of short, wiry branches at the ends. If such is the case it will be well to cut them back, perhaps one-fourth of their length. New shoots will soon be sent out and, as they will make a strong, vigorous growth, a new head will soon be formed. Unless the water sprouts, that are likely to form lower down on the branches, are needed to fill in open spaces in the head of the trees or to form a new head where the old branches have been cut off, they should be removed. Occasionally some pruning will be needed to permit of working beneath the trees with teams, but this does not always require the removal of entire branches.

When the trees are old anl lacking in vigor it is best to do this pruning in the early spring, before the buds start, in order that the full force of the trees may be exerted in forcing out the new shoots. On the other hand, an orchard will occasionally be found that has been making too rank a growth without producing fruit, and in that case the pruning can be delayed until the latter part of May, when the growth will have started. A severe pruning at that time will check the growth and induce the formation of fruit buds. In pruning branches back to a crotch or to the trunk, the cut should be made at an angle of about fifteen degrees with the trunk or main branch. When made parallel to the trunk it leaves too large a wound, while if at right angles to the branch that is to be cut off a stub is produced. This will be unsightly and will not be covered by the growth of the tree nearly as well as when made in the proper manner.

Grafting is often recommended as one of the steps in renovating old orchards, but, except that it may be used to change worthless to more desirable sorts, grafting of itself is of slight value in orchard renovation. The supposed benefit from grafting arises from the fact that when large trees are grafted the branches are cut back to permit of the insertion of scions. In this way the number of buds is greatly reduced and, the full force of the tree being thrown into those remaining, a strong, vigorous growth is secured. In addition to the benefit obtained by grafting in securing better fruit, some benefit will be seen if the new variety has a foliage that can better resist the attack of fungi, and if it is naturally of a more healthy growth. Aside from these effects, the real benefit that is noticed from grafting is derived from the pruning that must be given the trees, and this will generally give as good or better results than when combined with grafting.

CULTIVATION.

Nearly all old orchards are in sod and, wherever possible, it will be well to plow and keep them in cultivation for at least one or two years. When the ground is covered with a sod the trees are robbed of their food and, during the summer, the rain that falls is taken up before it reaches the roots of the trees. Even though cultivation is not kept up it is almost necessary, at first, to start a new growth, without which the best results cannot be expected. The plowing can be done either in the

fall or early in the spring, taking care not to injure the roots, and up to the first of July, or even to the first of August if the weather at the time is dry, the land should be harrowed every week or ten days. This will conserve the moisture and favor the growth of the trees while it, at the same time, prepares the land for a cover crop. Although hardly thought of ten years ago, some form of winter cover crop is desirable in all cultivated orchards. They aid in ripening the trees in the fall, prevent the washing of the land during the winter, hold the leaves and snow, and thus lessen the depth of the frost and the danger of root killing, and, in the spring, can be worked into the soil and thus provide humus and plant food for the trees. If a good catch was secured and the crop has been properly handled the turning under of a cover crop will have a marked effect upon the physical condition of the soil. Instead of being dry and crumbling during the summer, it will be moist and friable, the humus serving as a sponge to hold the water.

Of the various crops that have been tested as orchard covers, mammoth clover, if it can be sown as early as the first of July, has given the best results, all classes of soils considered. Alfalfa, crimson clover and hairy vetch have also given good satisfaction. Of the other leguminous crops, some of the hardier cow-peas, such as the Whippoorwill, provide a good cover on warm soils if sown in drills about the first of July and cultivated for three or four weeks. Canada peas, either alone or with barley or oats, also make a good cover crop even though the sowing be delayed as late as the middle of August. If the seeding has to be delayed much after the middle of August, the oats can be used alone and will furnish a good cover by the time growth is stopped by frost.

The clovers, peas and vetch are nitrogen gatherers and, as they take from the air and leave in the soil large amounts of this valuable element, they have some advantage over oats and barley. It has been shown, by analysis, that a good crop of cow-peas or vetch will furnish to the soil from fifty to one hundred pounds per acre of nitrogen, which is worth at fifteen cents per pound, the amount it would cost in commercial fertilizers, from seven dollars and fifty cents to fifteen dollars. If the crops survive the winter they should be turned under before the ground has dried out and become baked. When left until they have blossomed, the stalks become woody and decompose very slowly. The fact that a crop winters over is often an injury on heavy soils as the ground dries out very quickly, and the trees are deprived of water at the very time they will need it. Another point in favor of the oats and similar crops that are killed by the winter is that they serve as a mulch in the spring and, when the rush of work is over, can be worked under by means of a harrow in a quarter of the time it would take with a plow. By the use of harrows with extension heads, the ground can be worked beneath the trees with the team three or four feet away. For the average soil, and especially those that are inclined to suffer from drought, it will be best to continue this treatment year after year. Occasionally, the clover, alfalfa and similar crops may be left until a second year, and where the soil is fairly moist, good results can be obtained if kept seeded to clover for a number of years if the crop is cut two or three times during the season and allowed to remain on the ground to serve as a mulch and increase the humus in the soil. The results that can be secured in this way are

far better than can be obtained when the orchard is kept in timothy or blue-grass sod, or when clover is grown and the crop is taken off once or twice each year. Some recommend using the orchards as pastures for sheep or hogs during the summer that they may eat the fruit that drops from the trees, and thus destroy the insects that it usually contains. If there is clover in the orchard, they will seldom injure the trunks of the trees but, unless the trunks are high, the sheep may browse the lower branches and destroy all of the fruit within reach.

MANURING.

Many of our old orchards have made annual growths of but three or four inches, and few have grown more than six or eight. It can be put down as a general rule, that unless the length of growth averages ten or twelve inches the supply of plant food is insufficient, and manure in some form should be supplied. In making a selection of the fertilizer that is to be used for this purpose, the abundance and cost of the various materials should be considered. If they can be secured, the best dressing for each acre of apple orchard that is undergoing renovation is about twenty tons of partially decomposed stable manure and one hundred bushels of unleached hard wood ashes. The stable manure contains an excess of nitrogen and will aid the trees in making a vigorous growth, while wood ashes contain potash and phosphoric acid which will render the growth firm and solid and aid in the formation of fruit buds. Wood ashes vary widely in the amount of plant food that they contain, but if from hard wood and unleached there should be about five per cent of potash and one and one-half per cent of phosphoric acid. Basswood and elm contain more than maple, oak and beech, while the coniferous trees, such as the pines, firs and spruces, contain somewhat less. If wet, or leached, the amount of potash may be greatly reduced and care should be used, in purchasing them, to get some idea of the amount of plant food they contain. Aside from this the value of ashes will vary with their abundance, as compared with stable manure. Thus if stable manure is worth one dollar per ton, it would be unwise to pay more than three or four dollars for a ton of an average grade of ashes. Each one must fix a sort of sliding scale of prices for himself. Thus we can often get them for five cents per bushel or less, but it will be cheaper to pay even ten cents per bushel than to pay one dollar per ton for stable manure delivered on the land, while fifteen cents per bushel will be cheap for the ashes, as compared with the cost of commercial fertilizers. The value of stable manure varies widely but, considering its importance in supplying humus, and as compared with commercial fertilizers, a good grade of stable manure from grain-fed animals is worth two dollars per ton delivered and spread on the land. The figures given as the value of wood ashes and stable manure, as compared with commercial fertilizers, are, I am well aware, much higher than is commonly paid for these materials. My reason for giving them as I have is that I am often asked, "What kind of commercial fertilizer shall I get for my orchards, as I cannot obtain either stable manure or wood ashes?" My answer is, "that if you cannot get wood ashes and stable manure for the prices named, I suggest the use of fifty to one hundred pounds of nitrate of soda, one hundred to two hundred

pounds of muriate of potash, and two hundred to four hundred pounds of ground bone per acre, and the use of leguminous cover crops to supply nitrogen and humus." The smaller amount would cost about five dollars per acre, while the larger quantity recommended would cost twice that sum but would suffice for two years. After the trees have produced one crop, the amount might be increased with profit as, on many soils, the use of ten cents per tree for additional fertilizer might give one barrel more of apples, that would be worth from one to two dollars, and thus give back the investment with usury.

While the use of fertilizers for apple orchards where everything is favorable for the crop would be highly profitable, I am firmly of the opinion that it would be better if manure and wood ashes could be obtained, and in a majority of cases it would be possible to secure them either on the farm or from nearby villages.

SPRAYING.

The last of the four more important steps in the renovation of an old orchard, is the spraying of the trees. This is placed last, not because deemed of least importance, as of them all it will do most to give a crop of perfect fruit, but because it naturally follows the others, and although there is less need for it when the trees are making a strong, healthy growth from being properly cared for in other ways, the best results from spraying cannot be obtained unless each of the other matters referred to has had proper attention.

Spraying, as ordinarily carried on, is for the purpose of securing freedom from the attack of insects and plant diseases.

In spraying for the destruction of insects, we naturally make two classes of the remedies that we may call special and general. The first class of sprays are used only occasionally, and if the trees are well cared for may never be needed. This special spraying is used for the scale and other sucking insects. Among these are the green lice, or apple aphis, which occasionally appear in large numbers on the opening buds. They seldom do much harm to large trees, but may be treated with the approved remedies if very numerous on newly planted orchards. The oyster-shell scale is often found in old and neglected orchards. These are easily destroyed by spraying with kerosene emulsion about the time the young lice hatch, which is early in June in most seasons. When the trees are manured and cultivated, and especially if they are sprayed with Bordeaux mixture, using a surplus of lime, this insect will soon disappear without the special spraying.

There are several other scale insects that may appear in an apple orchard, and among them the San Jose scale. The note of warning against this insect was sounded several years ago, but I would repeat it now with renewed force. Do not be deceived by the statements in the papers that the fruit growers in New Jersey, Georgia and other states no longer fear this insect. Perhaps the word fear is used advisedly. While I am not afraid of this minute creature as I would be of a masked burglar armed with a revolver during the hours of night, I certainly feel a pronounced dread at its appearance in the State. There is not a fruit growing state to the east of us where it has not done from ten to a thousand times the

harm it has caused in Michigan. However, it has been found in twenty or more places in this State, and as it was unnoticed for five or six years in three or four orchards, it spread in each case over several hundred of the trees and actually killed many of them. Where this insect has become scattered in a locality, all admit that it is practically impossible to eradicate it, and the orchards where it has appeared, if the trees are not injured so much that it will be best to destroy them, need to be sprayed at least once each year with some special spraying mixture. These applications are quite expensive and require some skill and care in their preparation and application. If, by using the ounce of prevention in the way of keeping out this pest, we can save hundreds and thousands of pounds in controlling it, the money will be well invested. If we do not fear it, we should at least have a wholesome dread of its appearance in our neighborhood.

The spraying mixtures that are of a general nature, are the arsenites for the destruction of the biting and chewing insects, and copper sulphate, in some form, for the fungous diseases. Many of the old orchards are infested with canker-worms and tent-caterpillars, which destroy the foliage in the early spring. Some people claim that spraying with arsenites will not control them. This is a mistake as has been shown hundreds of times. Some eight years ago the canker-worms appeared on a few trees in the college orchard, but two or three sprayings checked them and not one has been found since although quite common in neighboring orchards. At various times, I have arranged for co-operative spraying experiments in different sections. Last year work was done in an orchard where the canker-worm had been at work for several seasons, and where the trees had been sprayed with no apparent effect, and the owner declared that spraying did not pay. In 1901, this orchard was leased, at my suggestion, by a horticultural friend, and was given two thorough sprayings just before and just after the trees blossomed. At the time of the first spraying, the worms were just hatching and the trees were alive with them. After the second application I examined the trees and could find but a single worm, and this one appeared to have a bad case of stomach ache. Even though there were neither canker-worms nor tent-caterpillars in the orchard, these two application would be desirable for the codling moth, curculio, and various leaf-eating insects. The materials used were white arsenic and Bordeaux mixture. The codling moth has two broods, and the spraying given just after the petals fall, will destroy the first one, but many failures have resulted from attempts to control the second in winter varieties. Many of these failures were due to too few and too early applications. In addition to the three applications made during May and June at least one more will be required, and this should be made about the first of August. To have this effectual, it should be very thorough, so that every fruit will be coated. If this is not secured success will not be obtained.

While there is a marked difference in varieties few old orchards will give fruit free from apple scab, a fungus which attacks both fruit and foliage. If the weather is damp at the blossoming time, the fungus may appear on the flower stalks and destroy the entire crop. Later on, it may

show on the leaves and, if the attack is severe, may cause many to drop besides seriously injuring the others.

For fifteen years, we have had a very effective treatment against this disease in Bordeaux mixture, a combination of lime and sulphate of copper, used at the rate of one pound of each to ten or twelve gallons of water. If the leaves and fruits are covered with this, before the spores have germinated, all danger of attack will be prevented. It combines with white arsenic and Paris green, so that it is possible to use a fungicide and an insecticide in one application. The treatments recommended for the insects, should be made at the same dates as are desired for the fungi. Those made just before and after the blossoming period are of most importance. In some cases a single application after the blossoms show, but before they open, has saved the crop from destruction by the apple-scab fungus. The only difficulty is that showers at this time often render spraying impossible and, at best, the period is not long enough to get over large areas. For this reason, it is recommended that the trees be sprayed with a solution of copper sulphate in April, and that so much of the orchard as possible be sprayed with Bordeaux mixture after the flower buds show but before the petals open. By the use of four applications of Bordeaux mixture, such varieties as Fameuse and others that are especially subject to scab, can be grown without serious injury. In our experiments in spraying apples on trees forty years old, we have been able to make a difference in the number of scabby fruits of eighty per cent. Eighty-seven per cent of the unsprayed fruit being scabby, and a majority were so badly diseased that most of them were graded No. 2, at best, while the sprayed fruit had but seven per cent with any scab at all, and very few of these had enough to greatly affect their market value.

With a modern pump, a tank, and other approved spraying machinery, the labor of spraying has been reduced at least three-fourths as compared with what is was fifteen years ago. In the light of recent experience, it is hard to see how any one can engage in commercial apple culture and expect to make a success unless he practices spraying. To secure the best results from spraying, one should know when to spray, what to spray with, and how to apply it to get the best results. Ideal spraying consists in keeping the foliage and fruit covered with the spraying mixture from the time growth starts until danger from insect and fungous attack is over, and unless this is done perfect results cannot be secured. Early and thorough spraying will be needed.

While the recommendations regarding pruning, cultivation, manuring and spraying may appear to some of you to be theory, I wish it understood that, on the contrary, they are based on the practical experience of some of the best apple growers in Michigan, New York and other states. You have all heard of the five hundred dollar crops of peaches taken from an acre of land in the Michigan peach belt. I can refer you to apple orchards that, during the last five years, have given larger returns than have come from nine-tenths of these peach orchards. For the most part, these have been years of partial failure in apple orchards and, except that these orchards were on good soil and in favorable locations, they were not model orchards ten years ago, but by thorough and persistent work along the lines indicated the trees have been reclaimed from their barren condi-

tion, and brought into regular and abundant fruitfulness while the neighboring orchards are still practically barren.

Many of you will remember, that the excellent paper of Prof. Cooley proves from the census returns, that about the only counties in which the rural population showed an increase during the last decade were Kent, Allegan, Van Buren and Berrien, and that he ascribed the gain in these counties to their peach crops. I happen to know of a number of apple orchards in each of these counties that contest with the best peach orchards in their net profits. Should not the apple orchards have a part of the glory in saving the honor of the State?

As shown by the figures given above, the acreage of apple orchards in the other counties in southern Michigan has shown a decrease, and the rural population has also decreased. When the farmers of these counties come to their senses and renovate the more promising apple orchards, may we not expect that the financial returns will soon be such that these counties will show a gain in their rural population by the end of this decade?

CANADA, WHAT SHE HAS DONE FOR THE FARMER BY ORGANIZATION.

BY GEO. C. CREELMAN, TORONTO, CAN., SUPT. FARMERS' INSTITUTES FOR ONTARIO.

It gives me very great pleasure indeed, to be with you this evening and to tell you about our work in Canada. In the first place, as a Canadian, I feel a deep interest in Michigan, for I understand that about one-third of your population is from Great Britain or Canada. In the second place, I spent a full summer in study at the Michigan Agricultural College, and I come back to talk to you as a former student.

We are proud to feel in Canada that we have been of use to the United States, and have helped you in your development. Hundreds of thousands of our people have crossed our borders and settled in the States. We are almost purely an agricultural country and we are particularly a live stock country; and usually we have sent to you only good farmers. But we have also given you many leaders in agricultural education. In the recent Live Stock Exposition, the finest show ever held on this continent, classes of college boys competed for prizes in the judging of stock. Out of the eight teams competing six were trained by Canadian instructors.

In Canada we are coming to feel that the farmers ought to be the most independent class of people in the world. We find professional men going into politics hedging on one question or another, but the farmer is independent in thought and action. His personal success does not so much depend upon what people think of him, and he can say frankly what he thinks; but it is sometimes hard to get farmers to realize that they can thus be independent and that this is one of their richest possessions.

I like your meeting here. You are frank and free in your discussions and earnest in your desires to learn more about your business. But you who are present here do not need all this added knowledge as much as some of your brother farmers do who do not get out to these meetings.

Now in Canada we are trying to reach the man who sits in the back seat, the man who has not been interested in the advanced methods. We have men with us who will not tell what they do know, and they have been successful, but because of selfishness they won't tell how they succeeded. We are trying to draw these men out.

Our strongest association is our Live Stock Association. Eight years ago we had only fifteen men in this association which was then formed. Now this small membership was in spite of the fact that we have a mild moist climate, and hence an excellent live stock country. We have for our area a larger per cent of full blood stock than any other portion of North America. But after awhile we found, and especially during the hard times, that we had on hand an excess of high priced stock. Our stockmen began to turn their attention to the great Canadian Northwest as a place for disposing of this excess. But there is only one railroad into that country and the extremely high freight rates had practically prohibited long distance shipping of stock. So six of these fifteen members of the Live Stock Association went down to railway headquarters at Montreal to see if they could not get concessions as to rates. They were very politely informed that when the railway managers desired the advice of Canadian farmers about managing their railroad, word would be sent them to that effect. Our delegates were then bowed out of the office. But our folks thought they would simply have to succeed, so they started to enlarge the Live Stock Association. They carried on a campaign of education, they made our stock growers see the advantages of organization. They kept at it until today they have 2,500 members. With these backings they went a second time to the railway officials but they got the same reply as before; so they went before the Dominion Parliament and got a law enacted compelling the railway to reduce its rates for stock. Whereas, we used to have to pay from $30 to $90 freight for each animal from Ontario to the Pacific coast, we now pay only $12 to $20. And since this reduction we have sent over $1,000,000 worth of stock into the Canadian Northwest.

Our next association of interest is the *Provincial Winter Fair*. I cordially invite you all to come over to it next December. I am really serious about this, for it is a rather unique institution, and you would all be interested in it I am sure. It is held in Toronto, and is run entirely by the live stock men. Animals are brought in ready to be slaughtered, $10,000 in prizes are offered. The animals are judged in the ring from the standpoint of the consumers. Then the animals are killed and judged again in the carcass. We have a lecture room with a capacity for 1,500 people. The judges when judging, both on the hoof and on the carcass, are required to give reasons for their judgment. This is not an easy task for the judges but is extremely instructive to the audience. You can see at once how valuable this fair may be to those men who are ambitious to grow cattle cheap or only those which shall give the best satisfaction to the consumers and hence bring the top price. It enables the grower to reach some conclusions as to what sort of an animal makes the carcass most desired by the butchers.

Our next institution of interest is *The Horse Show*. This is an annual fair held in April in Toronto. It is largely devoted to farm work horses. Many horses are bought and sold at this show.

The hog is one of the Canadian farmer's best friends, but our Canadian hog today is not a third cousin to the hog that used to be grown. Our market demands a hog varying from 160 to 220 pounds. We have to rely largely on the British market, and the British people will not eat thick fat meat. Our own people have come to have the same tastes, so we must grow lean meat. Our market demands bacon with streaks of lean. At our fairs in Canada you very rarely see a fat hog. Of course, we cannot raise fat pork in competition with your corn-fed western hogs, but for our market we do grow a satisfactory and perfect hog. The Yorkshire, Tamworth, and Long Berkshire, in the order named, are our favorite breeds for practical use.

I will next take up *our dairy industry* and try to tell how perfectly organization has helped to build it up. Last year our Canadian dairy products were valued at $25,000,000. We used to grow wheat, wheat, wheat. We depended on wheat for ready cash, the boys depended on wheat for a pair of new boots, and the girls depended on it for the new dress. But wheat went down in price and the Canadian farmer had to get something else to bring him ready money. Dairying has done this. It has gradually driven out wheat and the Canadian farmer is now no longer dependent upon wheat. Through it he has quit the credit system and paid off his mortgage. There is no question but dairying has helped our farmers as much as any other one thing.

This building up of the dairy industry has not been accomplished by guess work. From the first it has been fostered by legislation. At the beginning we started out a series of traveling dairies. They were laughed at by the farmers, but we had a work to do and went right on. We went into every county in Ontario. We got out big bills and advertised liberally. Many came for curiosity. Lots of these came to scoff, but if some of them did not remain to pray they at least went back home and quietly began to practice the methods we had taught them in these traveling dairy schools, and this accompanied by dairy education resulted in a greatly increased quality of butter.

Then we have permanent dairy schools. The first one was at Guelph and we have established two more. There are 250 students at these three schools, and it may seem strange to you but no small proportion of these students is made up of cheese and butter makers who have had years of experience in their business. In spite of their experience these older men have recently seen the younger fellows, who had been thoroughly trained in the dairy schools, turning out a better product and getting more money, and they saw that they too would have to keep up with the procession. So we have some men fifty years old taking the course in these dairy schools and learning scientific methods. And scientific methods, by the way, are only proper methods done by rule.

But we are now meeting a new obstacle, running against an unlooked-for snag. As the factories come to get old they are not cared for so well in some cases, and from one cause and another we find bad flavors creeping into the product. So we are going to send competent instructors to every factory that has any difficulty of this sort and these instructors will study the situation and stay right there until the evil is remedied.

A few years ago we found that our Agricultural College at Guelph, and an extensive college it is too, was only reaching comparatively few

of our farmers. We asked ourselves what can the college do to help the older boys and their fathers who cannot go to college? Must we wait for the college graduates to take the lead in better farming? To solve this question we started co-operative experiments. These as you know are experiments conducted by the farmers themselves, under the direction of the college. We are very careful that these experiments shall be along the lines of great practical use. At first we had only 12 of these experiments. Today we have in Ontario 7,000 young men who are conducting co-operative experiments in connection with the agricultural college. We have the advantage of possessing a man peculiarly qualified to direct this work in the person of Prof. Zavitz, who keeps close track of all his 7,000 boys. You can readily see the value of these experiments. You will agree with me that the difference between the average crop that the farmer grows and the possible crop is too great. I doubt if it is too much to say that the average crop is only half of what it ought to be. What is the trouble? Prof. Zavitz says that for one thing we do not select our seed carefully enough. Some farmers sow screenings, and only a few select seed with care. In fact I believe no class of people allow as many chances to get away from them as the farmers do. Of course, you cannot figure out the cost of production as exactly as the manufacturer can, but that is all the more reason why you should master general principles and so take advantage of the small but important points. These co-operative experiments are destined to teach our young farmers not only better methods but also the value of studying their business carefully.

FARMERS' INSTITUTES.

I had modestly left this to the last because the management of this work is my particular business just now in Ontario. We try to make the institute work a more extensive work than is done by the other associations I have named. We try thus to put on the cap sheaf to the other associations. This year we held 800 meetings and had an attendance of 140,000 people. Our meetings are mostly one-day institutes and we carry them into every nook and corner of the province. We are especially anxious to reach the farmers in the back districts and the farmer that is non-progressive. Our institute societies charge a membership fee of twenty-five cents per year and we have this year 20,000 paid members. Each member is entitled to the printed reports of all these associations which I have named. These reports are printed by the government and comprise about sixteen volumes a year. These are mailed free to members of the institute societies who are paid up, and only to such members, so our people are coming to feel, as you will see by this large membership, that to keep abreast of the times they must read more, observe closer and think harder.

In closing permit me to thank you heartily for your cordial attention and your apparent interest in the work Canada is trying to do for her farmers.

THE CANNING FACTORY.

BY HON. GEO. E. HILTON.

This is a new business comparatively in Michigan. It might be called an infant industry, if you will allow a common phrase. It seems to fill a long felt want. It is the ideal business for giving a home market to the farmers. Fruits and vegetables in scores of localities in this State have in days gone by gone begging for a home market. You know the story well how the word came back from the commission house that the consignment did not bring enough to pay freight. But the canning factory pays cash, takes all the fruit, saves crates, saves trouble, saves annoyance, and is a good thing all around.

Our factory in Fremont makes a specialty of fruits; the only vegetables we handle are peas, tomatoes and pumpkins. The demand for all these canned goods is increasing at a remarkable rate. There is no question whatever but what the business will develop tremendously. We have no fears about not getting a market. Any community with a reasonable amount of fruit should have a canning factory. With our annual resources in fruit lines there is no reason why Michigan should not be a leader in the canning industry. This tends to make smaller farms and more of them and more prosperous farmers.

The question is sometimes asked how get a canning factory? In the first place it is important that the farmers and villagers shall have a mutual interest. They must feel that the factory cannot be a success unless both take hold of it, and this is no small advantage, as it brings better feeling between the town people and the country people.

With us we need more of the smaller fruits; for instance the cherry makes very nice fruit for canning.

Let me close by again calling your attention to the purposes for this business. We have at our doors the markets of the world. We can ship canned goods to any climate, for they will keep for years. We could sell ten times what we have. We doubled the capacity of our factory last year. In less than ten years the farming country around Fremont, which not so very many years ago was almost a wilderness, will be one vast garden.

DISCUSSION.

Q. What is the cost of a cannery?

Mr. Hilton: Ours cost about $10,000 for ground, building and machinery. We can a car load a day.

Q. Is yours a co-operative cannery?

Mr. Hilton: No, it is not.

Q. Is not Michigan fruit better than California fruit, either raw or canned?

Mr. Hilton: Yes, I think it is.

Q. What is the usual proportion of fruit to vegetables canned in factories?

Mr. Hilton: The largest factories usually make specialties of some line.

Q. How do they keep up the work through the season?

A. Well, we usually can start in with peas, asparagus and tomatoes. Then we have our fruit and late vegetables; still this doesn't take us nearly through the season.

Q. Are the farmers suited?

Mr. Hilton: Yes, sir. Many of the stockholders are farmers. Some of them could not pay for the stock on the start, but have paid for it in produce. We have a small capitalization and employ 150 men.

Q. What is the acreage of fruit needed for a $10,000 factory?

Mr. Hilton: The amount of the crop varies so that I could hardly state with any accuracy.

Q. What acreage of peas and tomatoes do you utilize?

Mr. Hilton: Two to three hundred acres of peas and two hundred acres of tomatoes.

Q. What do you pay?

Mr. Hilton: We pay $6.00 a ton for tomatoes. This year will pay $7.00 a ton. We pay two cents a pound for peas and furnish the seed peas.

Q. What are the best kinds?

Mr. Hilton: The Alaska pea and New Stone tomato.

Geo. W. Gehlbach: As to whether the farmers are suited, it is reported at Fremont that peas netted some farmers $18 per acre and that one farmer got $90 from an acre of cucumbers.

RAISING FRUIT AND VEGETABLES FOR THE CANNING FACTORY.

GEO. E. ROWE, GRAND RAPIDS.

We are dealing with a matter of fact business proposition, a matter of *sweat* and *bread*, a matter of *work* and *gold;* and, as in all other propositions there are many factors to be considered. The *consumer, canner, grower, soil, labor, cultivation, road, wagon, distance, quantity* and *varieties.* The interest of the consumer, canner and grower are one. No man can live unto himself and prosper. The consumer pays his hard earned money for a can of fruit. He ought to get what he pays for in *quality, kind* and *quantity;* and it is of special concern to the canner and grower to see that he does. For it is here that we are in close touch with "the goose that lays the golden egg." A *good, honest quart of fruit calls for ten more* while one poor can destroys the sale of twenty. The successful up to date canner has learned that to build up a reputation and have an increasing demand for his goods he must put good fruit in the cans and so in turn, the up to date grower has learned that the canning factory is not a dumping ground for his old stuff that he cannot sell elsewhere; but that the factory wants and demands the best that he has.

It is the good things that increase the demand in all departments of economic life and development, the medium and common fall in line to supply a demand that has been previously created when the best is gone; or when perchance the purse is lean. The personal, therefore, in this proposition to be dealt with is, the delicate, refined palate of the consumer. He demands a good thing from the man who takes his money. The canner builds his factory, makes his cans, arranges his processing apparatus, hires his help and calls for fruit. He must fill his cans and keep his help employed and so he is obliged to quite an extent to take whatever the grower brings him, some half green, some over ripe, some tasteless and some, perchance, with good flavor. He has no patent process whereby he can ripen the green fruit in the cans or remove the bitter from the rot.

He is at the mercy of the grower. He simply preserves by canning the fruit as he receives it from the producer, so, if the fruit is medium or poor the canned goods would be poor and medium and must be sold to the man with the lean purse, who can only give a lean purse in turn to the man who has produced the fruit. Here again, I wish to emphasize my former statement that the best interest of the consumer, canner and grower are one and inseparable. The grower can bring smiles or frowns, praises or cursings from the lips of his colleagues. He can increase rapidly the demand for canned fruit or he can retard it; and when he comes to realize his power and the profit that is within his easy reach, he will no longer look upon the canning factory as a dumping place or consider that anything is good enough for the cannery; but will take as much pains and have as much pride in growing and sending good fruit to the canning factory as he would to the retail grocer, his best friend or his own table. The canneries want a firm, dark red strawberry, a solid bright raspberry, a scarlet tomato, a blue plum, a yellow pear, and a good sized yellow peach. They want them because the consumers want them, the consumer wants them because he has found them to be good, and such goods may be grown in almost unlimited quantities at a good profit to the grower and canner, at the same time giving the best of satisfaction to the consumer. The question of what to grow for the canning factory is surrounded by a set of local conditions dependent upon soil, labor, roads and distance. The matter of soil has been so ably treated with reference to its adaptability for the growing of fruits and vegetables by the agricultural department at Washington and by our own beloved college and experiment station that I shall simply refer you to their very valuable bulletins on this subject. Labor must be considered and the man who has crops to gather in sufficient quantity during the whole season to give steady employment will be better able to deal with the labor problem than the man who only wants help occasionally or who has but one thing to market. The economical use of labor in cultivating, picking and marketing must be considered by every man who grows fruit and vegetables for market.

The wagon, road and distance cannot be ignored for they are real problems that add to or take from the profits. A good wagon that will hold one hundred bushels of tomatoes can be taken to the factory by the same man and team that would commonly haul twenty-five bushels and thereby greatly decrease the expense of production and increase the profits.

There is so much to this road problem, I can but mention it in the economical handling of fruit. We need better roads, we want better roads, we demand better roads, and we will have better roads for the benefit of our dumb animals, for the benefit of our families and for the increasing of our profits by decreasing the expense of transportation.

There is an increasing demand for canned goods, we have the soil, climate and quality of fruit, we have the labor and skill, we have the money and enterprise, and there is good money to be made in the business. During the next ten years we ought to add at least one hundred canning factories to what we already have and they ought to be built in the small towns and villages of our State, and those towns and centers that realize the present opportunity and seize upon it intelligently will be sure to profit thereby.

FRIDAY FORENOON.

Prof. Smith: The State Horticultural Society and the Institutes have agreed that the Institutes shall not take up questions that concern wholesale growing of fruit. We have also agreed with the State Dairy Association that creamery butter making and cheese making shall be left for them to discuss, so this morning we shall take up the question of home butter making. And in the enforced absence of Mr. N. P. Hull, who was to discuss the topic of "The Care of the Cow and Feeding," I will spend a few moments in discussing the question.

We have heard at this meeting something about the difference between scientific principles and the rule of thumb. This difference applies to the cow. The 1902 cow is about the same sort of animal as was the 1802 cow. She responds to care and attention in about the same way. In those days they had plenty of pasture, which is an almost perfect ration for the dairy. Then the milk was produced in the summer, almost never in the winter.

What then is new in dairying? Not very much. What then is there to talk about? Well, we know why and how to feed. We know a good deal more of this than we did, and above all, we know how much we do not know and this is a good deal. Gov. Hoard says that the most mysterious animal in the world is the cow; you get contrary results that are most amazing.

Mr. Welch says feed silage for the best results; others believe in feeding other succulent foods, and think that silage is bad for the cow. But we know today that silage is one of the most economical foods for the dairy cow. I mean silage which is mature, that is made from glazed corn, that is grown from seed raised in the vicinity, that is put into a gas tight silo and one that is filled slowly. And by the way, a wood silo is good but a cement silo is better. Prof. King has estimated that a gas tight silo pays in the saving of fodder. Do not put the silo in the middle of the barn unless you have good ventilation.

Feed your silage after milking. The next best food is clover hay, though it has not been easy to produce in recent years. It is good because it furnishes protein. In fact it is richer in protein than is cheese and it furnishes a cow what we get in our eggs, lean meat, and cheese.

And above all do not despise book learning. I do not believe any man in America can feed cows as economically as he might if he would read and study Prof. Henry's "Feeds and Feeding." I unhesitatingly recommend this book to every dairyman, and to other farmers for that matter. The beauty of this book is that Prof. Henry did not write it out of his own experience alone, but collected the experience of practical men. Another book is Craig's "Stock Judging." You can get these through our Farm Home Reading Circle. We must take advantage of the experience of others and the time has gone by for hand work alone.

I have got off the subject a little. I was talking about protein. What else besides clover contains protein? Oats and peas and crops of the same character. So as a substitute for clover hay where you have sandy

soil or have continued in not getting a catch of clover, I would strongly recommend sand lucerne. I have a table showing the results of experiments with sand lucerne.

Shall we grow alfalfa? Yes, but begin in a small way and experiment. If it does well, increase gradually.

DISCUSSION.

Q. Where can we get seed of sand lucerne?

Prof. Towar: Wernich Seed Company, Milwaukee, has the seed for sale, twenty cents a pound. Use from 15 to 20 pounds per acre.

Q. Is sand lucerne better than clover?

Prof. Smith: By all means raise clover if you can.

Q. Do you have to fertilize for sand lucerne?

Prof. Towar: No. The field where ours is growing has had no fertilizer since 1897. Moreover, it was a piece of ground where the surface soil had all been scraped off. After plants had been growing two years on this soil we endeavored to see how far down the roots went, and seven feet below the surface we found roots one-eighth inch in diameter, and we quit digging.

Q. How long will sand lucerne stay in the soil?

Prof. Towar: Forever.

Q. Is it being grown in this State?

Prof. Towar: Yes, it is growing successfully in Ogemaw, Antrim, Grand Traverse, and Otsego counties.

Q. When do you sow it?

Prof. Towar: In the spring. Do not pasture it. Mow it very early in the spring so as to cut the weeds.

Q. What does it yield?

Prof. Towar: In 1898, the first season for ours on the college farm we got three crops. The yield for the season was at the rate of 6,000 pounds per acre: the next year at the rate of 10,580 pounds per acre: and in 1900 we got four crops with a yield at the rate of 12,310 pounds per acre. It grows from two to three feet high and has a purple blossom. Sometimes it can be cut the first season but not usually.

Q. Can it be grown on muck?

Prof. Towar: In Lapeer county Mr. Ferguson sowed on muck and got a ton and a half per acre that same fall. He sowed six acres last spring. It might not stand the winter on muck. It is not intended for heavy clay nor for any land where the water table is high. On such soils we should use grasses.

Mr. Raven: I have a piece of muck land that was burned over. I want to seed it to pasture. Mr. Clark of Wisconsin recommended timothy and a little Alsike but my cows do not eat Alsike. What would you advise me to do?

Prof. Smith: Sow red top. Get fine recleaned seed. This seed costs more and is hard to sow but germinates better.

The question was asked, will cows eat Alsike? Nearly every one said yes but Mr. Raven, who said that Alsike grown on muck in his neighborhood was not eaten by the stock. There seems to form a sort of gum on it. Horses and sheep won't eat it. It seems to cause slobbers in horses. One or two others reported the same experience. Mr. Wilcox reported that it was just as bad on sand as on muck.

Prof. Smith continued his talk as follows: Besides silage and legumes, feed cotton seed meal this winter. This is the cheapest form of protein. Do not mistake this for linseed meal. Cotton seed meal is constipating and makes hard butter. Linseed meal is loosening and makes soft butter. A good ration can be made up of bran, clover hay, and silage, with a little cotton seed meal added, or if you have no silage, you can use corn stalks mixed with hay and corn and you can add linseed meal. Gluten meal is a cheap form of protein, but it makes butter sticky and hard to churn.

I insist if we are to make butter on the farm for a business, we must have eight or ten cows. You cannot afford to carry less. For these you need a warm barn but one well ventilated. Cows need fresh air as much as we do, but it must not come through cracks. As to the stall, I would put in either the Hoard or Bidwell stall. This keeps the cows clean and gives us pure milk. You cannot get clean milk without some sort of stanchion. The old fashion stiff stanchion does fairly well, but I prefer the stall I have named, where the cows are loose but are prevented from backing and getting dirty.

HANDLING CREAM AND MAKING BUTTER.

BY W. A. ELLIS, BRAIDWOOD.

I think we are preaching better dairying with good results. The annual loss sustained through the marketing of poor butter is simply enormous. Outside of the creamery the principles of butter making are but little understood. At our place we are improving from twenty years' experience and considerable study of the subject. I will treat my topic under three heads. First, flavor; second, body or firmness; third, texture.

Flavor is the most important of all, and is in these days a subject of study. Flavor depends to a large extent upon the proper ripening of cream. There are three ways to ripen cream.

First, there is spontaneous action, leaving it to nature. Good butter is made in this way, but you cannot get uniformity from day to day by this course. There are many conditions affecting flavor. Different germs act differently and produce different results. This difficulty must be overcome, and today we must control the situation, so we utilize the starter.

Second, the home made starter. This is made by ourselves. Take the milk from a healthy cow, cool it first, then put it in a temperature of from 80 to 90 degrees. In 24 hours it will be fully ripened or sour, and has a nice acid flavor. Take some skim milk and heat it to 150 degrees to kill the bacteria and reduce the temperature to 65 or 70 degrees, add the sour milk just spoken of, and you will have a starter. Add this starter to the cream and you get a uniformity of flavor and a nice sweet aroma. You can use the starter for some time. You can also make a starter from buttermilk, but it will deteriorate before long. Remember that the starter is the foundation on which we work.

Third, We can purchase a commercial starter and this is done in the creamery. It gives the same results, but the home made starter is satisfactory for home dairying.

Now as to *firmness*. Feed and breed have something to do with this, but the souring process which I have described also has something to do with producing solid butter. The proper use of proper starters is likely to give firm butter. Keep the cream at a rather low temperature while ripening. Seventy-five degrees is too high. Sixty degrees is much better. At the last temperature named the butter will be much firmer, even if you can

only cool the cream down to that just before churning; but try to get it to fifty-five degrees before churning. You get a more exhaustive churning and will have little buttermilk at this temperature.

Texture is the third point. Churning has something to do with texture. Churn at fifty-eight degrees or lower with well ripened cream. When the butter granulates, stop, draw off the buttermilk, add cold water to reduce the temperature ten degrees. This process brings the granules to a condition where you can stir them much like wheat or peas. I wash the butter twice and the salt is usually added after washing. I use Diamond Crystal salt, from one ounce to one and one-half ounces to a pound of butter, depending upon the amount of water left in the butter.

Working also affects the grain. Do not overwork it, for this makes it salvy. We use the V-shaped worker with a lever.

DISCUSSION.

Questions answered by Mr. Ellis.

Q. How often do you work the butter?
A. Once.
Q. How long do you let the butter stand after salting, before working?
A. I work it right away.
Q. How long do you churn?
A. Usually in 40 minutes. Our churn is a large one, holding from 100 to 150 pounds. In a small churn it might come too quick. I think 40 minutes is about right.
Q. How do you separate the cream?
A. I use a cream separator, and think it is the ideal way. The cream is aerated as it passes off, and thus you have full control of it. Cool the cream down right from the separator, and keep each day's cream by itself.
Q. How much starter is needed to a gallon of cream?
A. A quart is enough for three or four gallons of cream.
Q. How long can you keep the starter?
A. Two to three weeks, if you want to.
Q. Do you stir the cream?
A. Yes, it is a good thing.
Q. Do you aerate the milk?
A. Not when we use the separator.
Q. What separator do you use?
A. The Empire.
Q. Why not use buttermilk for a starter?
A. It absorbs impurities, deteriorates quickly, and gets worse every time you use it. I want to add right here that not one person in ten has proper facilities for making good butter. It doesn't pay to sell in a country store. Get a good market. Buy Prof. Henry's book and study it.

PRESIDENTS AND SECRETARIES, COUNTY FARMERS' INSTITUTE SOCIETIES, 1902-1903.

County.	President.	Address.	Secretary.	Address.
Alcona	Robert Walker	Harrisville	L. A. Colwell	Harrisville.
Alger.*				
Allegan	T. G. Adams	Shelbyville	L. C. Root	Allegan.
Alpena	W. F. Anning	Dafoe	George T. Cathro	Cathro.
Antrim	Eli Pickard	Alden	T. W. Howard	Alden.
Arenac	Nelson Ireland	Standish	H. A. Chamberlain	Standish.
Baraga.*				
Barry	James M. Bauer	Hastings	J. F. Edmonds	Hastings.
Bay			W. J. Bierd	Auburn.
Benzie	J. C. VanBlaricom	Honor	R. B. Reynolds	Inland.
Berrien	C. B. Groat	Niles	F. C. Franz	Niles.
Branch	L. E. Lockwood	Coldwater	E. E. Lewis	Coldwater.
Calhoun	T. J. Shipp	Eckford	William Powell	Marshall.
Cass	G. H. Redfield	Cassopolis	Clarence Wells	Cassopolis.
Charlevoix	E. B. Ward	Charlevoix	R. W. Paddock	Charlevoix.
Cheboygan	John Schannenk, Jr.	Cheboygan	C. F. Smith	Cheboygan.
Chippewa.				
Clare	J. Littlefield	Farwell	A. R. Canfield	Clare.
Clinton	L. G. Bates	Elsie	Charles Krell	Elsie.
Crawford	Henry French	Pere Cheney	John A. Love	Roscommon.
Delta.*				
Dickinson.*				
Eaton	J. H. Gallery	Eaton Rapids	George A. Perry	Charlotte.
Emmet	James Bradley	Goodhart	Mrs. J. L. Morris	Harbor Springs.
Genesee	D. P. Dewey	Grand Blanc	A. J. Cox	Rogerville.
Gladwin	E. N. Fairchild	Dale	H. R. Clarke	Gladwin.
Gogebic.*				
Gd. Traverse	Lowell Sours	Elk Rapids	E. O. Ladd	Old Mission.
Gratiot	Newton Burns	St. Louis	F. M. Hetzman	Beebe.
Hillsdale	E. T. Parker	Hillsdale	N. I. Moore	Jonesville.
Houghton.*				
Huron	Richard Parr	Rescue	John Harrison	Bad Axe.
Ingham	H. M. Young	Mason	R. J. Robb	Mason.
Ionia	N. B. Hayes	Muir	H. E. Powell	Nickel Plate.
Iosco	James Nisbet	Tawas City	John W. King	Vine.
Iron.*				
Isabella	Charles M. Brooks	Mt. Pleasant	M. E. Kane	Mt. Pleasant.
Jackson	Frank Dwelle	Grass Lake	N. M. Davis	Grass Lake.
Kalamazoo.*				
Kalkaska	Charles Barnard	Kalkaska	Isaac Simpson	Kalkaska.
Kent	George E. Rowe	Grand Rapids	Geo. R. Richardson	Grand Rapids.
Keweenaw.*				
Lake	Spencer Fradenberg	Chase	W. S. Gordon	Chase.
Lapeer	E. E. Owen	Lapeer	Fred Parmelee	Lapeer.
Leelanau.				
Lenawee	David Woodward	Clinton	Smith Munger	Tipton.
Livingston	Frank Backus	Howell	Samuel Yerkes	Howell.
Luce.*				
Mackinac.*				
Macomb	Wm. H. Morton	Washington	Chester L. Priest	Ray Center.
Manistee	C. B. Canniff	Copemish, R. R.	J. H. Read	Copemish, R. R. 1.
Marquette.*				
Mason	C. G. Wing	Ludington	Jerome Harmon	Ludington, R. R. 1.
Menominee			Magnus Nelson	Menominee.
Mecosta	Aaron Amon	Remus	Frank Williams	Remus.

* No county institute society.

PRESIDENTS AND SECRETARIES, COUNTY INSTITUTE SOCIETIES, 1902-03.—*Concluded.*

County.	President.	Address.	Secretary.	Address.
Midland			J. W. Cochrane	Midland.
Missaukee.*				
Monroe	F. McFetridge	Ida	R. Ingraham	Azalia.
Montcalm	J. H. Haskins	Howard City	John Arbogast	Howard City.
Montmorency.*				
Muskegon	G. A. Whitbeck	Montague	A. B. Sumners	Montague.
Newaygo	Neal McCallum	Hesperia	G. W. Gehlbach	Fremont.
Oakland	Thomas J. Jones	Pontiac	Wm. Williamson	Pontiac.
Oceana	Caleb Davis	Mears		
Ogemaw	E. W. Clark	West Branch	Mrs. Cora L. Tolman.	West Branch.
Ontonagon	A. S. Cornell	Ewen	J. W. Robinson	Ewen.
Osceola.				
Oscoda	Robert Day	LeRoy	Clifton Bowker	LeRoy.
Otsego	A. R. Hurd	Elmira	B. D. Bailey	Gaylord.
Ottawa	F. M. Luther	Coopersville, R. R. 3	John T. Wilde	Coopersville.
Presque Isle	George Ingalls	Millersburg	Henry Whiteley	Millersburg.
Roscommon.*				
Saginaw	James A. Slocum	Saginaw, W. S. R. R.	E. A. Ellis	Bridgeport.
Sanilac	S. A. Turpening	Deckerville	Noah Davis	
Schoolcraft.				
Shiawassee			J. J. Whelan	Vernon.
St. Clair	James Dunn	Emmett	H. Maurer	Emmett.
St. Joseph	W. F. A. Bolander	Centerville	W. F. Wahl	Centerville.
Tuscola	A. A. Livingston	Cass City	J. D. Brooker	Cass City.
Van Buren	R. E. Jennings	Paw Paw	E. L. Keasey	South Haven.
Washtenaw	George T. English	Chelsea	Charles L. Foster	Ypsilanti.
Wayne	J. H. Vreeland	Wyandotte	R. Graden	Taylor Center.
Wexford	T. H. Callis	Manton	William Rose	Manton.

* No county institute society.

LIST OF DELEGATES TO ROUND-UP, 1902.

From County Institute Societies.

County.	Name of delegate.	Address.
Alcona	Joseph Yuill	Harrisville, Mich.
Allegan	T. G. Adams	Shelbyville, Mich.
Alpena	W. F. Anning	Dafoe, Mich.
Barry	J. F. Edmonds	Hastings, Mich.
Bay	W. J. Bierd	Auburn, Mich.
Benzie	W. Nutting	Benzonia, Mich.
Branch	L. E. Lockwood	Coldwater, Mich.
Cass	C. F. Wells	Cassopolis, Mich.
Clare	C. W. Perry	Clare, Mich.
Clinton	Charles Krell	Elsie, Mich.
Crawford	John A. Love	Roscommon, Mich.
Eaton	George A. Perry	Charlotte, Mich.
Emmet	John Swift	Harbor Springs, Mich.
Genesee	A. J. Cox	Rogerville, Mich.
Grand Traverse	G. A. Robertson	Traverse City, Mich.
Gratiot	F. M. Hetzman	Beebe, Mich.
Houghton	Robert Manderfield	Houghton, Mich.
Huron	John Harrison	Bad Axe, Mich.
Ingham	H. M. Young	Mason, Mich.
Ionia	H. E. Powell	Nickel Plate, Mich.
Isabella	Charles M. Brooks	Mt. Pleasant, Mich.
Jackson	W. F. Raven	Brooklyn, Mich.
Kalkaska	C. W. Barnard	Kalkaska, Mich.
Kent	George R. Richardson	Grand Rapids, Mich.
Lake	W. S. Gordon	Chase, Mich.
Lapeer	Fred Parmelee	Lapeer, Mich.
Lenawee	S. N. Munger	Tipton, Mich.
Manistee	J. H. Read	Copemish, Mich.
Mason	Jerome Harmon, R. R. 1	Ludington, Mich.
Mecosta	F. M. Williams	Remus, Mich.
Midland	J. W. Cochrane	Midland, Mich.
Monroe	R. Ingraham	Azalia, Mich.
Montcalm	C. F. French	Lakeview, Mich.
Muskegon	A. B. Sumner	Montague, Mich.
Newaygo	G. W. Gehlbach	Fremont, Mich.
Ogemaw	Mrs. Cora L. Tolman	West Branch, Mich.
Osceola	Clifton Bowker	LeRoy, Mich.
Ottawa	John T. Wilde	Coopersville, Mich.
Presque Isle	Henry Whiteley	Millersburg, Mich.
Saginaw	John F. Ure	Saginaw, Mich.
Sanilac	S. A. Terpenning	Deckerville, Mich.
Schoolcraft	F. Greenwood	Manistique, Mich.
Shiawassee	J. J. Whelan	Vernon, Mich.
St. Clair	H. Maurer	Emmett, Mich.
St. Joseph	W. F. A. Bolander	Centerville, Mich.
Tuscola	N. E. York	Millington, Mich.
Van Buren	E. L. Keasey	South Haven, Mich.
Washtenaw	George T. Engle	Centerville, Mich.
Wayne	R. Graden	Taylor Center, Mich.
Wexford	William Rose	Manton, Mich.

FROM GRANGES AND FARMERS' CLUBS.

Name of delegate.	Name of grange.	No. of grange.
J. C. Jewett	Essex Grange	No. 439.
Will Stocking	Lafayette Grange	No. 92.
R. Ingraham	Azalia Grange	No. 739.
L. W. Sibley	DeWitt Grange	No. 459.
George C. Myers	Sylvan Grange	No. 393.
M. S. C. Whitbeck	Lonsdale Grange	No. 733.
E. L. Lyman	Burns Grange	No. 166.
J. T. Bettis and wife	Trent Grange	No. 372.
Everett Case	Tipton Grange	No. 165.
F. B. Jones	Victor Grange	No. 677.
C. F. Crell	Elsie Grange	No. 202.

UNION FARMERS' CLUBS.

Name of delegate.	Farmers' club.
M. M. Hobart	Fairgrove and Guilford Farmers' Club.
J. J. Whelan	Shiawassee County Association of Farmers' Clubs.
Mrs. W. S. Gordon	Excelsior Farmers' Club.
William Sauer, Jr	North Owosso Farmers' Club.
James Sessions	Lebanon Farmers' Club.
H. A. Curtis	North Camden Farmers' Club.
C. F. Wells	Dowagiac Farmers' Club.

COUNTY INSTITUTES, WITH DATES AND ATTENDANCE.

County.	Date.	Place.	Attendance.							Av. per session.
			First day.			Second day.			Total.	
			A. M.	P. M.	Eve.	A. M.	P. M.	Eve. Woman's section.		
Alcona	Jan. 17-18	Harrisville	18	75	175	25	46	125	364	60
Alger*										
Allegan	Feb. 19-20	Allegan	40	130	150	86	122		528	106
Alpena	Jan. 15-16	Alpena	30	50	80	20	40	90 / 150	460	61
Antrim	Jan. 29-30	Mancelona	33	103	163	79	110		488	98
Arenac	Jan. 31-Feb. 1.	Standish	50	110	500	123	210		993	199
Baraga*										
Barry	Feb. 13-14	Hastings	60	165	75	115	175	250	840	140
Bay	Jan. 7-8	Kawkawlin	40	55	110	59	99	45	408	68
Benzie	Jan. 6-7	Frankfort	55	116	250	100	75	300	896	83
Berrien	Feb. 17-18	Niles	150	275	175	368	376		1,344	269
Branch	Feb. 12-13	Coldwater	330	308	379	353	900	600	2,270	378
Calhoun	Feb. 17-18	Tekonsha	87	200	275	180			742	186
Cass	Feb. 10-11	Cassopolis	40	175	225	150	140	300	730	122
Charlevoix	Dec. 16-17	Charlevoix	15	40	200	50	75	60	430	71
Cheboygan	Dec. 20-21	Cheboygan		31	200	23	25	30	309	62
Chippewa*										
Clare	Dec. 4-5	Clare	40	100	550	50	140	100	980	163
Clinton	Jan. 15-16	Maple Rapids	86	226	150	153	245		860	172
Crawford	Dec. 6-7	Grayling	8	30	25	28	32	25	148	25
Delta*	Oct. 3	Garden		200	250				450	225
Eaton	Jan. 16-17	Charlotte	150	310	150	210	340		1,160	232
Emmet	Dec. 18-19	Petoskey	100	60	110	100	99	120	589	98
Genesee	Jan. 22-23	Davison	80	300	325	200	375	425	1,705	284
Gladwin	Jan. 27-28	Gladwin	30	55	85	45	65	125	400	67
Grand Traverse	Jan. 27-28	Traverse City	44	70	76	90	87	42	409	68
Gratiot	Jan. 13-14	Ithaca	80	175	125	150	135	70	735	123
Hillsdale	Feb. 12-13	Litchfield	165	312	400	275	475		1,627	325
Houghton*										
Huron	Jan. 29-30	Ubly	75	150	250	150	225		850	170
Ingham	Feb. 19-20	Mason	36	150	60			55	301	75
Ionia	Feb. 11-12	Ionia	298	632	420	374	675		2,399	480
Iosco	Jan. 29-30	Tawas City	34	95	67	37	70		303	60
Iron*										
Isabella	Jan. 20-21	Mt. Pleasant	55	100	125	75	180		535	107
Jackson	Feb. 21-22	Brooklyn	125	275	340	275	300	130	1,445	240
Kalkaska	Dec. 2-3	So. Boardman	38	66	120	66	64	45	399	67
Kent	Jan. 17-18	Grand Rapids	50	75	15	50	40	25	295	49
Lake	Dec. 4-5	Chase	40	43	97	32	46	30	281	47
Lapeer	Jan. 24-25	Lapeer	75	210	225	185	340		1,035	207

COUNTY INSTITUTES.—*Concluded.*

County.	Date.	Place.	Attendance.						Total.	Av. per session.
			First day.			Second day.				
			A. M.	P. M.	Eve.	A. M.	P. M.	Eve. Woman's section.		
Leelanau*										
Lenawee	Jan. 10-11	Morenci	72	260	285	140	280		1,097	219
	Feb. 14-15	Tecumseh	90	200	350	215	410		1,265	253
Livingston	Feb. 21-22	Howell	200	415	225	400	433	350	2,023	337
Luce*										
Mackinac*										
Macomb	Jan. 20-22	New Haven	40	225	325	250	195	175	1,210	202
Manistee	Jan. 10-11	Bear Lake	93	125	100	75	75	150	618	103
Mason	Jan. 8-9	Ludington	70	83	31	110	300	150	744	122
Mecosta	Jan. 24-25	Sylvester	100	96	150	115	157		618	124
Menominee										
Midland	Jan. 8-9	Midland	50	125		75	150	225	625	125
Missaukee*										
Monroe	Jan. 22-23	Petersburg	60	200	300	108	235		903	181
Montcalm	Jan. 21-22	Lakeview	130	260	220	200	270	200	1,280	213
Montmorency										
Muskegon	Jan. 8-9	Montague	75	103	105	75	90	50	498	83
Newaygo	Jan. 10-11	White Cloud	71	91	98	82	90	25	457	76
Oakland	Feb. 17-18	Pontiac	132	247	450	210	500		1,539	308
Oceana	Jan. 13-14	Hart	42	85	200	80	150	45	602	100
Ogemaw	Dec. 4-5	West Branch	18	25	37	20	30	57	194	32
Ontonagon	Apr. 23-24	Ewen		74	252		78	238	642	
Osceola	Jan. 22-23	Evart	180	220	450	60	213		1,123	225
Ottawa	Jan. 15-16	Zeeland	104	172	225	78	150		729	145
Otsego	Dec. 2-3	Elmira	25	60	300	75	60	70	590	118
Presque Isle										
Roscommon										
Saginaw	Jan. 6-7	Freeland	106	182	375	250	280	600 200	1,993	249
Sanilac	Jan. 8-9	Brown City	59	280	640	350	640		1,969	394
	Jan. 30-31	Deckerville	150	350	550	250	420		1,720	344
Schoolcraft										
Shiawassee	Jan. 16-17	Durand	46	140	300	72	300		858	172
St. Clair	Jan. 20-21	Emmett	60	180	290	80	250		860	172
St. Joseph	Feb. 14-15	Centerville	40	220	225	100	175	600	760	127
†Tuscola	Jan. 27-28	Mayville	†30	†52	†20	37	121		260	52
Van Buren	Feb. 21-22	Lawrence	120	120	275	183	300		998	200
Washtenaw	Feb. 10-11	Dexter	54	204	280	75	170	80	783	130
Wayne	Jan. 24-25	Plymouth	105	350	320	275	250	200	1,300	260
Wexford	Dec. 2-3	Manton	57	69	300	75	100		601	120
			....	380	450	404	537	937		340
Round-up	Feb. 25-28	Ag'l College	404	537	937	415	511	337	4,081	
			110							
Total									60,546	

† Very cold weather.

ONE-DAY INSTITUTES, WITH DATES AND ATTENDANCE.

County.	State speaker.	Places.	Dates.	County secretary.	Attendance.			Total.	Average per session.
					A. M.	P. M.	Eve.		
Alcona	J. W. Hutchins	Fisher's Corners	October 23	L. A. Colwell	.....	.....	38	99	50
		Caledonia	" 24		.....	.....	61		
Alger*									
Allegan	J. W. Hutchins	Corning	January 7	L. C. Root	25	72	.....	1,385	99
		Moline	" 7		.....	70	.....		
		Dorr	" 8		.....	76	114		
		Burnip's Corners	" 9		80	115	325		
		Monterey	" 10		70	86	75		
		Hopkins	" 11		52	95	130		
Allegan	J. N. Stearns	Otsego	January 14	L. C. Root	150	250	290	2,375	198
		Cheshire	" 15		175	250	350		
		Leisure	" 16		60	100	200		
		Glenn	" 17		100	150	300		
		Ganges	" 18		.....	.....	.....		
Alpena	J. W. Hutchins	Toland Sch. House	November 5	E. H. Toland	.....	7	35	228	28
		Flanders	" 6		.....	6	51		
		Long Rapids	" 7		.....	28	32		
		Cathro	" 8		.....	14	55		
Antrim	L. R. Taft	Central Lake	December 3	D. W. Marsh	50	80	.....	300	50
		Alden	" 4		60	85	.....		
		Elmira	" 5		10	15	.....		
Arenac									
Baraga*									

Barry	A. M. Welch	Lacey	December 17	C. L. Henney	74	160		523	65
		Marshville	" 18		25	97			
		Middleville	" 19		20	43			
		Freeport	" 20		28	76			
Bay	Geo. A. True	Willard Sch. House	December 19	Wm. J. Bierd	18	16		133	33
		Auburn	" 20		28	71			
Benzie	J. W. Hutchins	Joyfield	November 19	R. B. Reynolds	18	22		61	17
		Honor	" 20		7	20			
Berrien	L. J. Post	Berrien Springs	December 17	F. C. Franz	55	140		455	92
		Buchanan	" 18		70	190			
Branch	L. W. Oviatt	Bronson	January 14	E. E. Lewis	90	232	250	2,354	196
		Gilead	" 15		97	150	120		
		California	" 16		150	257	275		
		Quincy	" 17		83	350	300		
Branch	A. M. Brown	Union	January 20	E. E. Lewis	75	150		.....	.....
		Girard	" 21		80	160			
		Batavia	" 22		75	170			
		Bethel	" 23		60	150			
Calhoun	N. P. Hull	Battle Creek	January 21	J. M. Willison	58	73		584	73
		Athens	" 22		26	88			
		Ceresco	" 23		54	87			
		Homer	" 24		68	130			
Cass	C. C. Lillie and L. E. Lockwood	Marcellus	January 29	John Dunning	36	75		803	114
		Volinia	" 30		†	†			
		Dowagiac (1)	" 31		72	150	50		
		Dowagiac (2)	February 1		135	185			
Charlevoix									
Cheboygan									
Chippewa									

† Smallpox.

ONE-DAY INSTITUTES, WITH DATES AND ATTENDANCE.—*Continued.*

County.	State speaker.	Places.	Dates.	County secretary.	Attendance.			Total.	Average per session.
					A. M.	P. M.	Eve.		
Clare	J. W. Hutchins	Winterfield	October 29	A. R. Canfield	45	65	.....	182	30
		Greenwood	" 30		15	28	.....		
		Sheridan	" 31		14	25	.....		
Clinton	L. E. Lockwood and J. W. Cochrane	De Witt	December 19	J. T. Daniells	3	16	.....	230	33
		Eagle	" 20		16	50	45		
		Duplain	" 21		40	60	.....		
Crawford	.....	.....	.....	.....	.....	.....	.....	.....	.....
Delta*	.....	.....	.....	.....	.....	.....	.....	.....	.....
Eaton	J. D. Towar	Sunfield	December 3	Geo. A. Perry	39	95	.....	1,094	122
		Potterville	" 4		90	110	150		
		Kalamo	" 5		.....	100	.....		
		Eaton Rapids	" 6		60	240	150		
Emmet	.....	.....	.....	M. J. Newsome	.....	.....	.....	.....	.....
Genesee	J. D. Towar	Goodrich	January 8	Frank H. Hill	175	300	275	1,939	215
		Grand Blanc	" 9		160	280	360		
		Thetford	" 10		64	165	160		
Gladwin	J. W. Hutchins	Dale	November 14	H. R. Clarke	25	55	68	148	49
Grand Traverse	J. D. Towar	Kingsley	December 17	E. O. Ladd	35	55	.....	489	45
		Kneal	" 18		20	28	.....		
		Keswick	" 19		22	35	.....		
		Williamsburg	" 20		26	80	.....		
		Old Mission	" 21		38	78	72		
Gratiot	L. W. Oviatt	Breckenridge	January 8	F. M. Hetzman	78	185	.....	363	121
		Alma	" 9		.....	.....	.....		
		Middleton	" 10		.....	100	.....		

Hillsdale	Chas. T. Richards and J. D. Towar...	Somerset Center	January 21	N. I. Moore	75	120	.....	1,150	127
		Adams Grange Hall	" 22		90	150	.....		
		Ransom	" 23		75	105	.....		
		Camden	" 24		105	230	200		
Houghton*	.....	.....	.....	.....	.....	.....	.....	.....	.....
Huron	W. H. Gilbert and P. Voorheis	Owendale	January 20	Thos. A. Ramsey	.....	38	.....	1,925	161
		Caseville	" 21		70	300	.....		
		Elkton	" 22		50	200	.....		
		Kinde	" 23		75	180	200		
		Bad Axe	" 24		52	260	.....		
		Harbor Beach	" 25		200	300	.....		
Ingham	P. Voorheis	Aurelius	January 6	H. M. Young	.....	25	.....	384	55
		Leslie	" 7		60	118	.....		
		Dansville	" 8		18	56	.....		
		Okemos	" 9		24	83	.....		
Ionia	P. B. Reynolds	Belding	January 28	Herbert Powell	140	160	.....	1,424	178
		Muir	" 29		95	200	.....		
		Portland	" 30		160	375	.....		
		Clarksville	" 31		107	187	.....		
Iosco	I. D. Suydam	Tawas City	January 14	H. L. Drake	.....	250	.....	340	113
		Whitmore	" 15		.....	50	.....		
		Hale	" 16		.....	40	.....		
Iron*	Leo M. Geismar	Iron River	March 21	.....	38	97	.....	157	67
Isabella	P. Voorheis	Herrick	December 17	M. E. Kane	20	50	.....	206	34
		Brinton	" 18		18	47	.....		
		Bloomfield	" 20		22	49	.....		
Jackson	C. D. Smith and C. C. Lillie	Parma	December 6	W. F. Raven	100	175	.....	2,093	166
		Napoleon	November 19		81	300	375		
		Horton	" 20		32	140	190		
		Concord	" 21		65	200	.....		
		Munith	" 22		110	225	.....		
		Cement City	.....		.....	100	.....		
Kalkaska	.....	.....	.....	.....	.....	.....	.....	.....	.....

ONE-DAY INSTITUTES, WITH DATES AND ATTENDANCE.—*Continued.*

County.	State speaker.	Places.	Dates.	County secretary.	Attendance.			Total.	Average per session.
					A. M.	P. M.	Eve.		
Kent	U. P. Hedrick and Mrs. Campbell	Lowell	June 25	W. K. Munson	.....	35	.....	35	35
Lake	.....	.....	.....	W. S. Gordon	.....	.....	.....	.....	.....
Lapeer	G. A. True	Hadley	January 16	F. E. Odell	70	140	.....	724	120
		Dryden	" 17		82	200	.....		
		North Branch	" 18		32	200	.....		
Leelanau*	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lenawee	A. M. Welch	Tipton	January 6	J. F. N. Bowen	61	160	150	1,211	93
		Rome Center	" 7		75	75	120		
		Hudson	" 8		.....	55	50		
		Cadmus	" 9		55	120	.....		
		Medina	" 10		.....	55	.....		
		Sand Creek	" 11		85	50	.....		
Lenawee	E. A. Croman	Clinton	January 14	J. F. N. Bowen	150	450	450	2,350	294
		Britton	" 15		.....	200	150		
		Ogden	" 16		200	350	400		
Livingston	L. W. Oviatt	Oak Grove	February 12	R. C. Reed	75	250	.....	890	149
		Iosco	" 13		75	198	.....		
		Hartland	" 14		82	210	.....		
Luce*	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mackinac	.....	.....	.....	.....	.....	.....	.....	.....	.....
Macomb	Chas. T. Richards and L. W. Oviatt	Washington	December 17	Burton Bates	25	60	60	395	66
		Utica	" 18		.....	.....	.....		
		Mt. Clemens	" 19		56	125	69		

Manistee	J. W. Hutchins	Pomona Pierport	November 21 " 22	J. H. Read	25 32	48 60		165	41
Mason	N. K. Potter	Summit Amber	December 17 " 18	Jerome Harmon	40 9	50 25		124	31
Mecosta	J. W. Hutchins	Morley Millbrook	November 25 " 26	J. E. Reiter		38 26		64	32
Menominee				Magnus Nelson					
Midland	J. W. Hutchins	Coleman Hope Poseyville La Porte	December 3 " 4 " 5 " 6	J. W. Cochrane	46 28 50	52 120 145 160	150 200 180 220	1,351	122
Missaukee*									
Monroe	C. C. Lillie	Ida London	December 19 " 20	R. Ingraham	27 84	75 216		302	75
Montcalm				John H. Jenson					
Montmorency	J. W. Hutchins	Hillman Big Rock	October 9 " 11		7	25 12	8	42	10
Muskegon	J. W. Hutchins	Lonsdale Silica Ravenna Trent	December 17 " 18 " 19 " 20	G. A. Whitbeck					
Newaygo				T. Harter					
Oakland	W. H. Gilbert and L. W. Oviatt	Clarkston Oxford Farmington Royal Oak Highland	February 10 " 11 " 11 " 12 " 15	G. M. Campbell	60 75 110 33 75	130 230 215 62 350	225 175 325	2,085	160

ONE-DAY INSTITUTES, WITH DATES AND ATTENDANCE.—*Concluded.*

County.	State speaker.	Places.	Dates.	County secretary.	Attendance.			Total.	Average per session.
					A. M.	P. M.	Eve.		
Oceana				C. F. Hale					
Ogemaw	L. W. Oviatt	Horton Twp.	November 12	Mrs. Cora L. Tolman		33	37	321	45
		Klacking Twp.	" 13			17	50		
		Edwards Twp	" 14				72		
		Churchill Twp.	" 15			37	75		
Ontonagon									
Osceola	L. E. Lockwood	Marion	December 17	Irvin Chase		32		89	29
		Tustin	" 18		15	42			
Oscoda				L. R. Comins					
Ottawa	L. W. Oviatt	Jamestown Center	December 3	Wm. Bos	40	50		357	44
		Conklin	" 4		23	29			
		Coopersville	" 5		60	104			
		Nunica	" 6		20	31			
Otsego				R. D. Bailey					
Presque Isle	N. K. Potter	Millersburg	January 15	Henry Whiteley	51	103		154	77
Roscommon									
Saginaw	P. B. Reynolds	Brant Center	December 16	John Ure		75		145	48
		Merrill	" 17			50			
		Birch Run	" 18						
		Blumfield	" 19			20			

Sanilac	W. H. Gilbert	Applegate	January 8	J. H. Murdaugh	.....	200	180	578	115
		Croswell	" 9		....	75	.....		
		Fremont	" 10		.....	60	... .		
		Amadore	" 11		.....	63	.....		
Schoolcraft	Leo M. Geismar	Manistique	January 25	Fred Greenwood	18	55	... .	73	36
Shiawassee	I. D. Suydam and P. Voorheis	Lennon	December 3	J. J. Whelan	.....	25	.....	90	30
		Byron	" 4		.....	.....	.....		
		Henderson	" 5		15	50	.....		
St. Clair	N. P. Hull	Yale	January 13	Henry Maurer	92	325	600	3,749	250
		Smiths Creek	" 14		105	320	500		
		Capac	" 15		68	250	500		
		Riley Center	" 16		89	225	180		
		Marine City	" 17		25	190	180		
St. Joseph	.....	.....	.....	Wm. F. Wahl	.....	.....	.....	.....	.....
Tuscola	E. A. Croman	Millington	January 21	Adam Haines	51	159	.....	683	96
		Reese	" 22		.....	60	.....		
		Kingston	" 23		61	147	.....		
		Gagetown	" 24		25	170	... .		
Van Buren	A. P. Gray	Cobert	February 11	E. L. Keasey	84	142	... .	1,495	187
		Hartford	" 12		52	112	.....		
		Lacota	" 13		200	285	.....		
		Bangor	" 14		220	400	.....		
Washtenaw	C. C. Lillie	Salem	January 14	C. L. Foster	176	190	225	1,554	155
		Ypsilanti	" 15		62	153	38		
		Mooreville	" 16		103	207	.....		
		Manchester	" 17		.....	.....	.....		
		Stoney Creek	.....		165	235	... .		
Wayne	W. H. Gilbert and P. Voorheis	Flat Rock	February 14	J. H. Hanford	125	155	... .	470	117
		Northville	" 20		40	150	.....		
Wexford	.....	.....	.....	Wm. Rose	.....	.....	.....	.....	.....
Totals								$39,985	

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